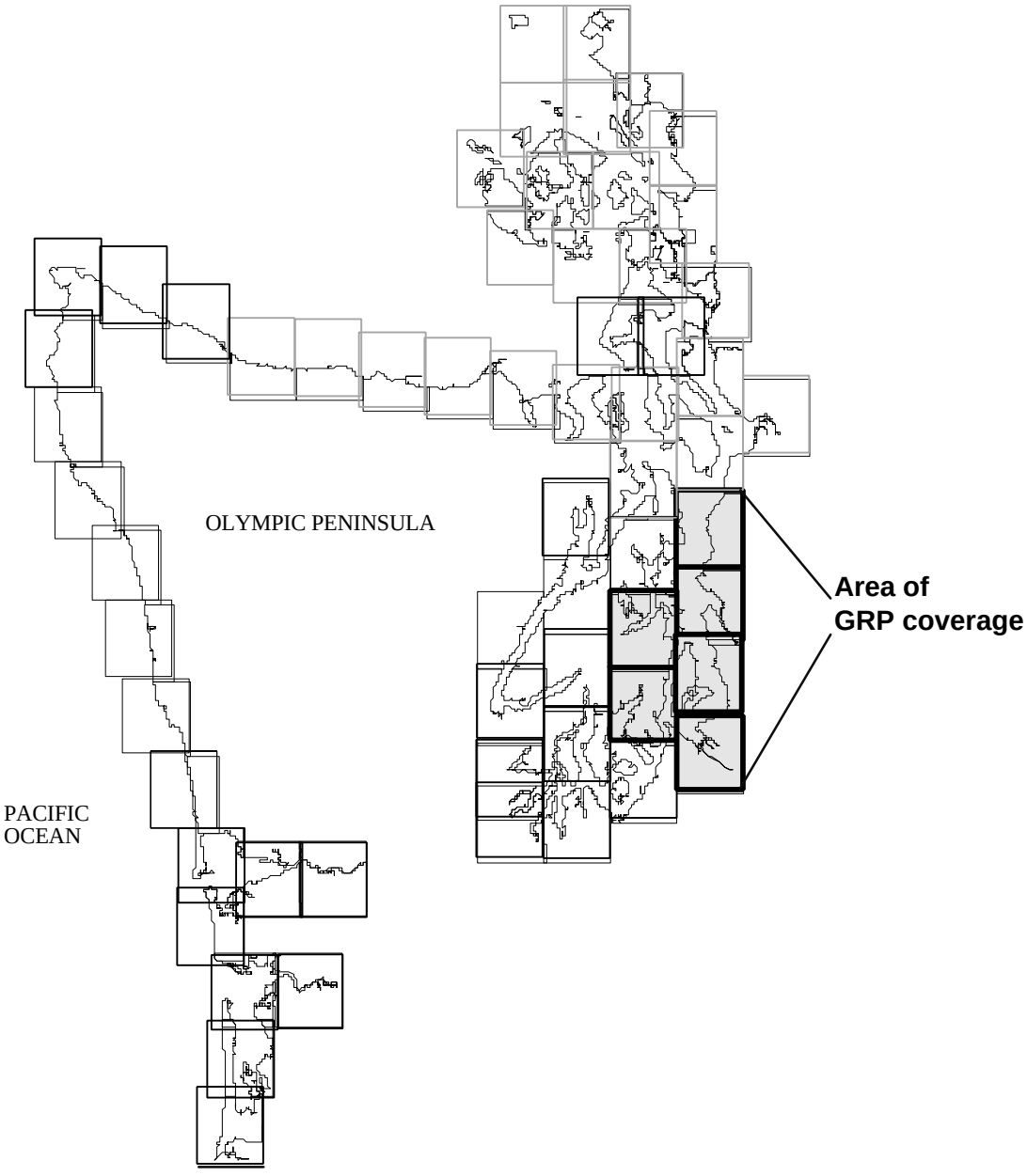
Northwest Area Committee

CENTRAL PUGET SOUND GEOGRAPHIC RESPONSE PLAN (GRP)



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Central Puget Sound Geographic Response Plan

Prepared for the Northwest Area Committee by a joint Committee Comprised of local, state, and federal government, tribal, and industry representatives. (*For specific contributors, see Appendix B***.)**

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Publication No. 94-205

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SPILL RESPONSE CONTACT SHEET

Required Notifications For Hazardous Substance or Oil Spills

USCG National Response Center..... **(800) 424-8802**
In Oregon:
Department of Emergency Management ..... **(800) 452-0311**
In Washington:
Emergency Management Division ..... **(800) 258-5990**
Department of Ecology Northwest Regional Office..... **(425) 649-7000**
Department of Ecology Southwest Regional Office..... **(360) 407-6300**

U.S. Coast Guard

National Response Center	**(800) 424-8802**
Marine Safety Office Puget Sound:	
Watchstander	**(206) 217-6232**
Safety Office	(206) 217-6232
Marine Safety Office Portland:	
Watchstander	**(503) 240-9301**
Safety Office	(503) 240-9379
Pacific Strike Team	**(415) 883-3311**
District 13:	
MEP/drat	(206) 220-7210
Command Center	(206) 220-7001
Public Affairs	(206) 220-7237
Vessel Traffic Service (VTS)	**(206) 217-6050**

Environmental Protection Agency (EPA)

Region 10 Spill Response	**(206) 553-1263**
Washington Ops Office	(360) 753-9083
Oregon Ops Office	(503) 326-3250
RCRA/ CERCLA Hotline	(800) 424-9346
Public Affairs	**(206) 553-1203**

National Oceanic Atmosphere Administration

Scientific Support Coordination	(206) 526-6829
Weather	(206) 526-6087

Canadian

Marine Emergency Ops/Vessel Traffic	(604) 666-6011
Environmental Protection	(604) 666-6100
B.C. Environment	(604) 356-7721

Department of Interior

Environmental Affairs	(503) 231-6157
	(503) 621-3682

U.S. Navy

Naval Shipyard	**(360) 476-3466**
Naval Base Seattle	(360) 315-5440
Supervisor of Salvage	**(202) 695-0231**

Army Corps of Engineers

Hazards to Navigation	(206) 764-3400

Muckleshoot Tribe

Administration	(253) 939-3311

Nisqually Tribe

Tribal Police	**(360) 456-5221**

Puyallup Tribe

Tribal Police	**(253) 597-6200**

Suquamish Tribe

Dispatch	**(360) 426-4441**

Federal O.S.R.O./ State Approved Response Contractors

Airo Services	(253) 383-4916
Clean Pacific Alliance	(800) 593-4272
Clean Sound Coop	**(425) 744-0948**
Cowlitz Clean Sweep, Inc.	(360) 423-6316
FOSS Environmental	(206) 767-0441
Fred Devine	**(503) 283-5285**
Global Environmental	**(206) 623-0621**
Island Oil Spill Association	(360) 378-5322
MSRC	(425) 774-6772
Tidewater Environmental	(503) 289-4274
&	(360) 695-8088

Washington State

Department of Ecology Headquarters	(360) 407-6900
Southwest Region	**(360) 407-6300**
Northwest Region	**(425) 649-7000**
Central Region	**(509) 575-2490**
Eastern Region	**(509) 456-2926**
Department of Fish and Wildlife	**(360) 534-8233**
Emergency Management Division	(360) 438-8639
	(800) 258-5990
State Patrol	
Bellevue	(425) 455-7700
Tacoma	(253) 536-6210

Oregon State

Department of Environmental Quality	(503) 229-5733
Emergency Management	**(503) 378-6377**
	(800) 452-0311
Stop Oregon Littering/Vandalism	(503) 844-9571

*** Boldface type are 24 hour numbers**

HOW TO USE THIS GEOGRAPHIC RESPONSE PLAN

Purpose of Geographic Response Plan (GRP)

This plan prioritizes resources to be protected and allows for immediate and proper action. By using this plan, the first responders to a spill can avoid the initial confusion that generally accompanies any spill.

Geographic Response Plans are used during the emergent phase of a spill which lasts from the time a spill occurs until the Unified Command is operating and/or the spill has been contained and cleaned up. Generally this lasts no more than 24 hours. The GRPs constitute the federal on-scene coordinators' and state on-scene coordinators' "orders" during the emergent phase of the spill. During the project phase the GRP will continue to be used, and the planned operation for the day will be found in the Incident Action Plan's Assignment List (ICS Form 204). The Assignment List is prepared in the Planning Section with input from natural resource trustees, the Incident Objectives (ICS Form 202), Operations Planning Worksheet (ICS Form 215), and Operations Section Chief.

Strategy Selection

Chapter 4 contains complete strategy descriptions in matrix form, response priorities, and strategy maps. The strategies depicted in Chapter 4 will be implemented after reviewing on scene information including: tides, currents, weather conditions, oil type, initial trajectories, etc.

It is assumed that control and containment at the source is the number one priority of any response. If, in the responder's best judgment, this type of response is infeasible then the priorities laid out in Chapter 4, Section 2 take precedence over containment and control.

It is important to note that strategies rely on the spill trajectory. A booming strategy listed as a high priority would not necessarily be implemented if the spill trajectory and booming location did not warrant action in that area.

The strategies discussed in this GRP have been designed for use with persistent oils and may not be suitable for other petroleum or hazardous substance products. For hazardous substance spills, refer to the Northwest Area Contingency Plan, Chapter 7000.

Standardized Response Language

In order to avoid confusion in response terminology, this GRP uses standard National Interagency Incident Management System, Incident Command System (NIIMS, ICS) terminology and strategy names, which are defined in Appendix A, Table A-1 (e.g. diversion, containment, exclusion).

CENTRAL PUGET SOUND
Geographic Response Plan

Record of Changes

Date	Change Number	Summary of Changes	Initials of person making change
July 1, 1993	Original Release	N/A	N/A
Nov 30, 1994	1st Change	Replacement of document - includes new chapters and revised Chapter 4 based on field verification	
July 1, 1997	2nd Change	Revision to Chapter 4 strategies; update of several text pages	
October 15, 1997	3rd Change	Area code changes to contact sheet, Chapter 7	
March 2000	4th Change	General update of Chapter 4; conversion of GRP to pdf for internet distribution	D Davis
December 2000	5th Change	Finalized changes from March 2000 updates	D Davis

Date	Change Number	Summary of Changes	Initials of person making change

Central Puget Sound Geographic Response Plan
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Central Puget Sound, WA

GEOGRAPHIC RESPONSE PLAN

1. Introduction: Scope of this Project

Geographic Response Plans are intended to help the first responders to a spill avoid the initial confusion that generally accompanies any spill. This document serves as the federal and state on-scene-coordinators "orders" during a spill in the area covered by this GRP (see Chapter 3 for area covered). As such, it has been approved by the U.S. Coast Guard Marine Safety Office and the Washington State Department of Ecology Spill Program. Changes to this document are expected as more testing is conducted through drills, site visits, and actual use in spill situations. To submit comments/corrections/suggestions please refer to Appendix C.

GRPs have been developed for the marine and inland waters of Washington, Oregon, and Idaho. They are prepared through the efforts and cooperation of the Washington Department of Ecology, Washington Department of Fish and Wildlife, Oregon Department of Environmental Quality, Idaho State Emergency Response Commission, the U.S. Coast Guard, the Environmental Protection Agency, tribes, other state and federal agencies, response organizations, and local emergency responders.

GRPs were developed through workshops involving federal, state, and local oil spill emergency response experts, response contractors, and representatives from tribes, industry, ports, environmental organizations, and pilots. Workshop participants identified resources which require protection, developed operational strategies, and pinpointed logistical support.

Following the workshops, the data gathered was processed and reproduced in the form of maps and matrices which appear in Chapters 4 through 6. The maps were generated using Canvas while the matrices were created using MS Excel. The balance of each GRP was produced using MS Word.

The first goal of a GRP was to identify, with the assistance of the Washington State Natural Resource Damage Assessment Team, resources needing protection; response resources (boom, boat ramps, vessels, etc.) needed, site access and staging, tribal and local response community contacts, and local conditions (e.g. physical features, hydrology, currents and tides, winds and climate) that may affect response strategies. Note that GRPs only address protection of sensitive **public** resources. It is the responsibility of private resource owners and/or potentially liable parties to address protection of private resources (such as commercial marinas, private water intakes, and non-release aquaculture facilities).

Secondly, response strategies were developed based on the sensitive resources noted, hydrology, and climatic considerations. Individual response strategies identify the amount and type of equipment necessary for implementation. The response strategies are then applied to likely spill scenarios for oil movement, and prioritized, taking into account factors such as feasibility, wind, and tidal conditions.

Draft strategy maps and matrices were then sent out for review and consideration of strategy viability. Field verification was conducted, and changes proposed by the participants were included in a semi-final draft, which was offered for final review to all interested parties and the participants of the field verification.

2. Site Description

Central Puget Sound is bounded by Edmonds to the north and Commencement Bay to the south. This also includes Liberty Bay, Port Orchard, Sinclair Inlet and Dyes Inlet.

Although abundant wildlife and natural resources exist throughout the region, it is heavily dominated by human population and important ports including Edmonds, Everett, Seattle, Tacoma, Bremerton, and Port Madison. Naval bases are also located at Keyport and Bremerton.

Several species of aquatic birds, clams, and beach spawning fish reside in Central Puget Sound. In the early fall, salmon return to many of the rivers and streams that flow into the Sound. In addition, kelp and eelgrass are common throughout the near-shore zone.[1]

Refer to Chapter 6 for detailed resource information.

2.1. Physical Features

The bays that comprise Central Puget Sound are generally characterized by sand and gravel beaches, sand and cobble beaches, and some areas of exposed tidal flats. Inlets that are adequately sheltered from Puget Sound itself have protected tidal flats and marshes. Central Puget Sound includes the following shoreline habitats:[2]

Pocket Beaches along rocky shores
Sand and cobble beaches
Sand and gravel beaches
Exposed tidal flats
Sheltered tidal flats

Commercial and ferry traffic dominate the area surrounding Edmonds, Bainbridge Island, Seattle, Vashon Island and Tacoma. Manmade features, including docks, wharves, fuel piers, waterways and marinas, also occupy much of the shoreline.

2.2. Hydrology

Net surface currents generally flow seaward and exit through Admiralty Inlet. A distinctive clockwise pattern exists around Vashon Island in East and Colvos Passages, extending from the surface to the bottom. There are also several eddies located off Alki Point.

Studies of contaminant transport in Elliot Bay show that contaminants introduced through the Duwamish River and the Seattle waterfront accumulate in a thin surface layer approximately five meters deep along the eastern side of the Bay. The along-shore current continues to West Point where tidal mixing destroys this distinct layer.[3]

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[1] National Oceanic and Atmospheric Administration, Environmental Sensitivity Index, Central & Southern Puget Sound (Seattle: 1984).
[2] Ibid.
[3] Evans Hamilton, Inc. and D.R. Systems, Inc., Puget Sound Environmental Atlas, vol. 1. (1987) 122-125.

2.3. Currents and Tides

The mean tidal range (MHW - MLW) for the Central Puget Sound area is 9.4 to 10.48 feet. The diurnal tidal range (MHHW - MLLW) is 13.1 to 15.0 feet. Tidal ranges increase further south.[4]

The average currents in the Central Puget Sound area do not exceed much more than a knot. Exceptions are areas in and around narrow passages including Agate Passage, Rich Passage, Port Washington Narrows, and Tacoma Narrows. Weak currents are experienced along the east side of Central Puget Sound from the 20-fathom curve inland and in Port Orchard, East Passage, Colvos Passage (on the flood), and Carr Inlet.[5]

Tides and currents vary with seasonal runoff and lunar cycles in localized areas. Spill responders should consult tide and current tables for their particular location.

2.4. Winds

The winds in this area are a result of diverse topography including the Cascade and Olympic Mountains. The westerly winds from the Pacific appear to flow to the north and south around the Olympics, causing what is commonly known as the "Puget Sound Convergence" on the eastern side.

From October though March and April through May, winds are generally from a southwesterly direction at 10 to 20 mph. The summer months, June through September, usually have winds from the north at 0 to 9 mph.[6] Local wind conditions may vary.

2.5. Climate

The area has a maritime climate with cool summers and mild winters. Annual precipitation rate is between 18 and 50 inches. Fog may cause visibility problems on about 25 to 40 days per year, usually in autumn and again in January and February.[7]

2.6. Risk Assessment

Not yet available.

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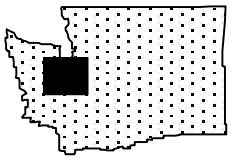
[4] National Oceanic and Atmospheric Administration, Tide Tables West Coast of North and South America. (1994).
[5] National Oceanic and Atmospheric Administration, Tidal Current Tables Pacific Coast of North America and Asia (1994).
[6] State of Washington Department of Natural Resources, Washington Marine Atlas, South Inland Waters, vol. 2 (1972).
[7] National Oceanic and Atmospheric Administration , U.S. Coast Pilot (1993) 312-313.

CENTRAL PUGET SOUND KEY MAP

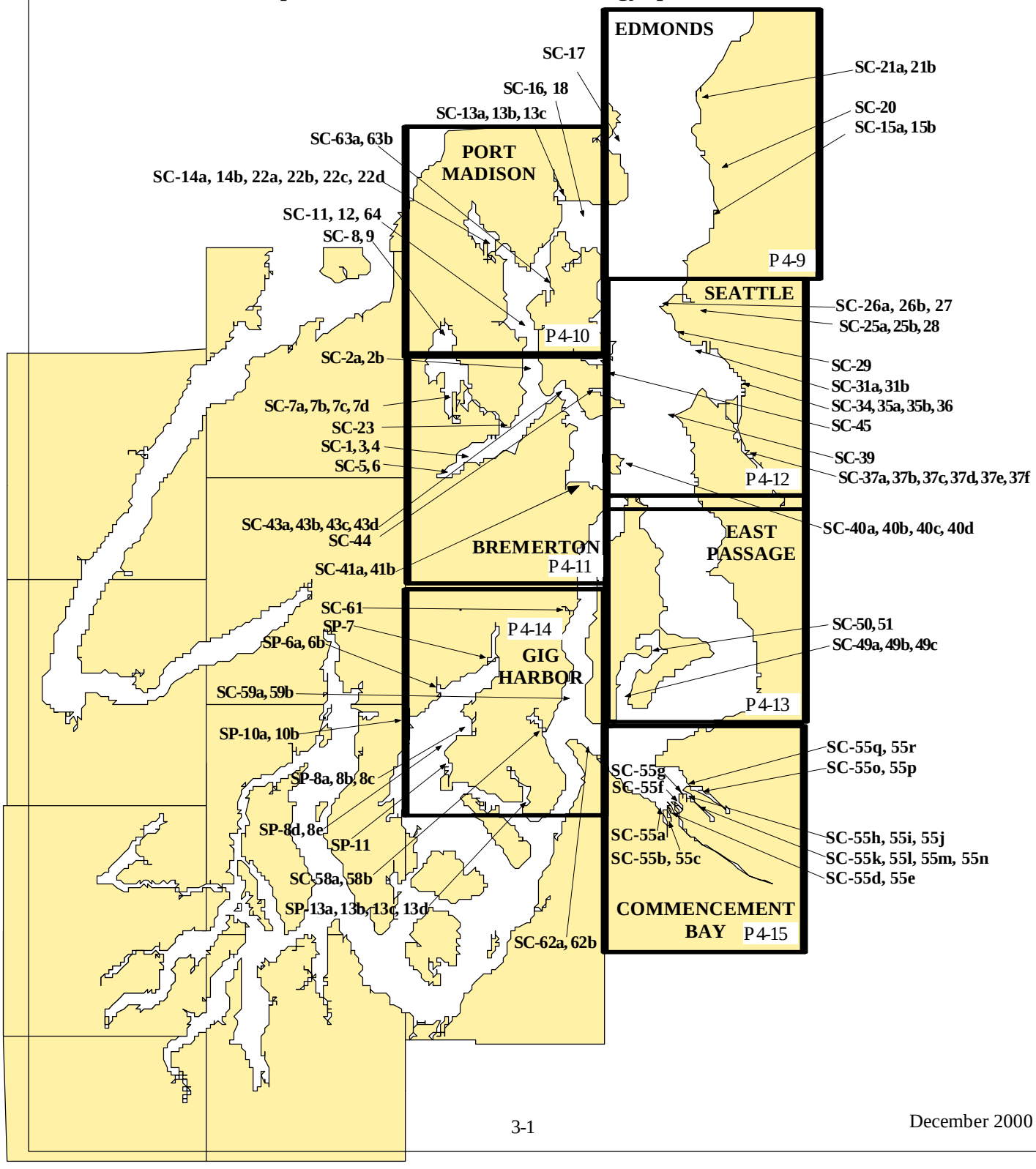


3. Reference Maps

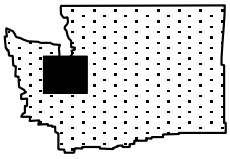
Strategy Locations

Reference Map 1 of 2

This map lists all response strategies for Central Puget Sound.
Refer to Section 4.2 for priorities and Section 4.3 for strategy specific information.

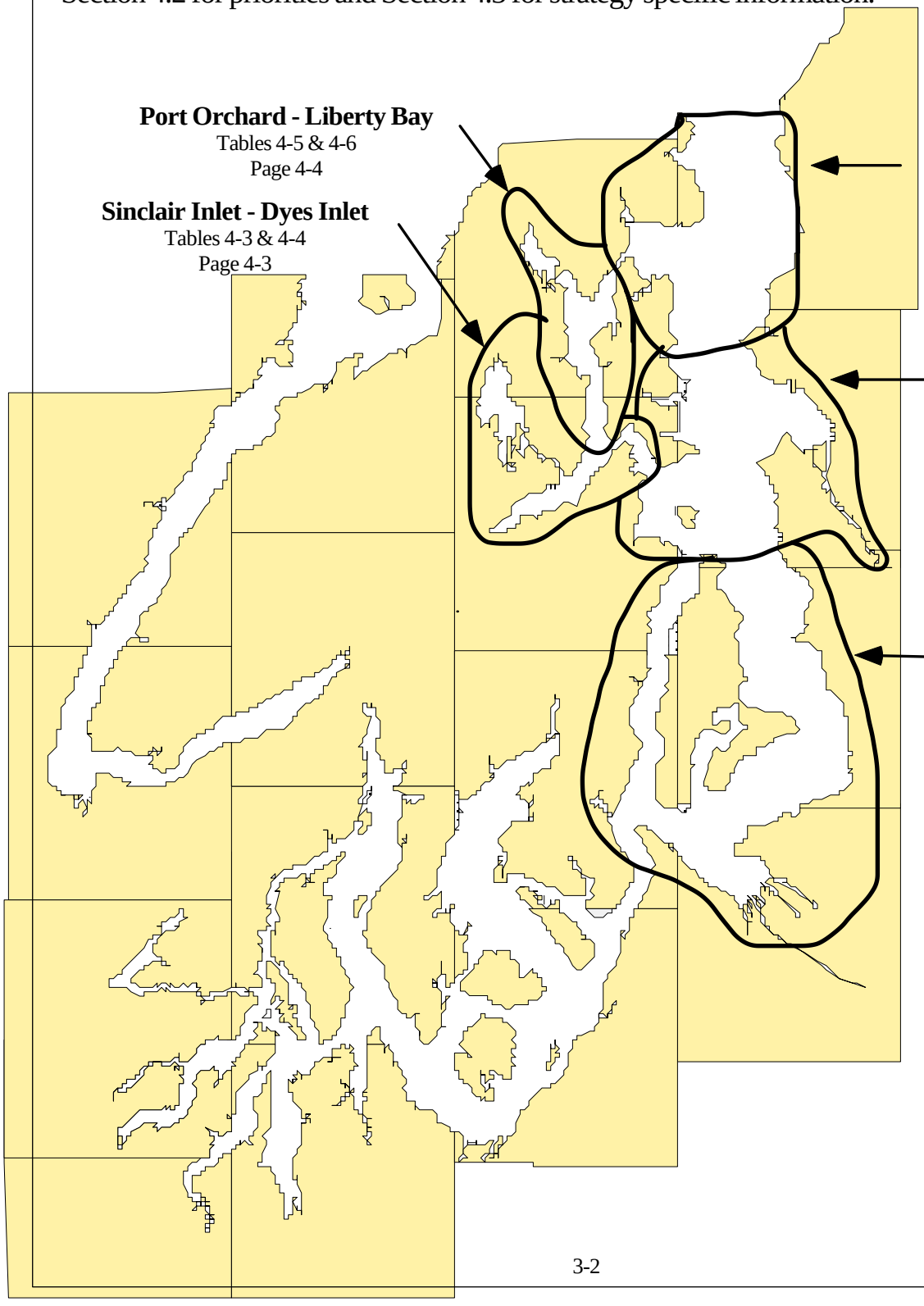


CENTRAL PUGET SOUND KEY MAP



Scenario Prioritization areas
Reference Map 2 of 2

This map describes the 5 scenario areas where response strategies are prioritized. Refer to Section 4.2 for priorities and Section 4.3 for strategy specific information.



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Sinclair Inlet - Dyes Inlet
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Edmonds - West Point
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Elliott Bay
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Tables 4-11 & 4-12
Page 4-7

Commencement Bay - Point Defiance
Tables 4-7 & 4-8
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4. General Protection/Collection Strategies

4.1. Chapter Overview

This chapter details the specific response strategies and resources to protect as outlined by the participants of the GRP workshop for the Lower Columbia River area. It describes the strategies determined for each area and the prioritization of those strategies. Note that GRPs only address protection of sensitive **public** resources. It is the responsibility of private resource owners and/or potentially liable parties to address protection of private resources (such as commercial marinas, private water intakes, and non-release aquaculture facilities).

Maps & Matrices

The maps in this chapter provide information on the specific location of strategy points. They are designed to help the responder visualize response strategies. Each Booming and Collection Strategy map includes a matrix on the facing page. Each matrix indicates the exact location, intent and implementation of the strategy indicated on the map. The "Status" column describes whether the strategy has been visited or implemented in the field; a reference number assigned to each entry relates to Table 4-13 (page 4-32), which provides more detail about each field visit/test.

Major Protection Techniques

All response strategies fall into one of three major techniques that may be utilized either individually or in combination. The strategies listed in 4.2 are based on the following techniques, and are explained in detail in section 4.3:

Dispersants: Washington State Policy currently does not allow use of dispersants in this area. Certain chemicals break up slicks on the water. Dispersants can decrease the severity of a spill by speeding the dissipation of certain oil types. Their use will require approval of the Unified Command. Dispersants will only be used in offshore situations under certain conditions, until further determinations are made by the Area Committee and published in the Area Contingency Plan.

In Situ Burning: Approval to burn in this area is unlikely due to the proximity of population to a potential burn site. Burning requires the authorization of the Unified Command, who determine conformance of a request to burn with the guidelines set forth in the Area Plan. This option is preferable to allowing a slick to reach the shore provided that population areas are not exposed to excessive smoke. Under the right atmospheric conditions, a burn can be safely conducted in relative close proximity to human population. This method works on many types of oil, and requires special equipment including a fire boom and igniters.

Mechanical Recovery Strategies: If a spill is too close to shore to use In Situ burning or dispersants, the key strategies are skimming and use of collection, diversion, or exclusion booming to contain and recover the oil, and prevent it from entering areas with sensitive wildlife and fisheries resources. These options are described in detail in Appendix A. Specific skimming strategies are not listed in the maps and matrices, but skimming should be used whenever possible and is often the primary means of recovering oil and protecting resources, especially when booming is not possible or feasible.

Priorities

The strategy priority matrices (Section 4.2.) were developed for subregions within the overall GRP area in order to reflect certain geographic divisions and specific scenarios. The response strategies indicated in the priority matrices are explained in detail in the Maps & Matrices section (Section 4.3.). It is implied that control and containment at the source is the number one priority of any response. If in the responder's best judgment this is not feasible, then the priorities laid out in the priority matrices take precedence over containment and control.

4.2. Strategy Prioritization

Table 4-1. Edmonds to West Point

Intent is to keep oil out of Port Madison SOURCE OF OIL: From the North			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-17	4-9	
2	SC-13b	4-10	
3	SC-13a	4-10	
4	SC-18	4-10	
5	SC-16	4-10	
6	SC-27	4-12	
7	SC-26	4-12	
8	SC-15a	4-9	
9	SC-20	4-9	
10	SC-21b	4-9	
11	SC-21a	4-9	Shut tidal gates

Table 4-2. Edmonds to West Point

Intent is to keep oil out of Port Madison SOURCE OF OIL: From the South			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-28	4-12	Use only if source of oil is in Lake Washington
2	SC-25	4-12	Same as above
3	SC-29	4-12	
4	SC-27	4-12	
5	SC-26a & 26b	4-12	
6	SC-13b	4-10	
7	SC-13a	4-10	
8	SC-18	4-10	
9	SC-16	4-10	
10	SC-17	4-9	
11	SC-15a	4-9	
12	SC-20	4-9	
13	SC-21b	4-9	
14	SC-21a	4-9	Shut tidal gates

Table 4-3. Sinclair Inlet and Dyes Inlet

Intent is to protect the rich fishery resources in both inlets SOURCE OF OIL: From inside Inlet(s)			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-23 or SC-1	4-11	Tide dependent - 23 Ebb,1 Fld
2	SC-5	4-11	
3	SC-6	4-11	
4	SC-3	4-11	
5	SC-7a, 7b, & 7c	4-11	Oil will travel into Dyes Inlet first during flood tide
6	SC-4	4-11	
7	SC-2a & 2b	4-11	
8	SC-43d	4-11	
9	SC-43a & 43b	4-11	
10	SC-40a, 40b, 40c, & 40d	4-12	
11	SC-41b	4-11	
12	SC-41a	4-11	
13	SC-44	4-11	

Table 4-4. Sinclair Inlet and Dyes Inlet

Intent is to protect the rich fishery resources in both inlets SOURCE OF OIL: Into Inlet(s) Through Rich Passage			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-43a & 43b	4-11	
2	SC-43d	4-11	
3	SC-2a & 2b	4-11	
4	SC-7a, 7b & 7c	4-11	
5	SC-1	4-11	
6	SC-5	4-11	
7	SC-6	4-11	
8	SC-3	4-11	
9	SC-4	4-11	
10	SC-23	4-11	

Table 4-5. Port Orchard and Liberty Bay

Intent is to protect the rich fish and wildlife resources in both areas SOURCE OF OIL: Through Agate Pass			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-14a & 14b	4-10	
2	SC-22b	4-10	
3	SC-22a	4-10	
4	SC-63a &63b	4-10	
5	SC-12	4-10	
6	SC-11	4-10	
7	SC-64	4-10	

Table 4-6. Port Orchard and Liberty Bay

Intent is to protect the rich fish and wildlife resources in both areas SOURCE OF OIL: From Sinclair Inlet (most likely wind driven)			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-14a & 14b	4-10	also see Table 4-4
2	SC-22b	4-10	
3	SC-22a	4-10	
4	SC-63a & 63b	4-10	
5	SC-12	4-10	
6	SC-11	4-10	
7	SC-64	4-10	

Table 4-7. Commencement Bay to Point Defiance

Intent is to protect rich fish and wildlife resources adjacent to Commencement Bay SOURCE OF OIL: Commencement Bay			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-55o – 55r	4-15	
2	SC-49a, 49b, & 49c	4-13	
3	SC-50	4-13	
4	SC-62b	4-14	
5	SC-51	4-13	
6	SC-59a & 59b	4-14	
7	SC-61	4-14	

Table 4-8. Commencement Bay to Point Defiance

Intent is to protect rich fish and wildlife resources adjacent to Commencement Bay SOURCE OF OIL: Ebb Tide with Oil in The Narrows			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-59a & 59b	4-14	
2	SC-61	4-14	
3	SC-49a, 49b, & 49c	4-13	
4	SC-50	4-13	
5	SC-51	4-13	If oil goes up East Passage
6	SC-62b	4-14	If oil goes up East Passage

Table 4-9. Elliot Bay

Intent is to keep oil from leaving Elliot Bay SOURCE OF OIL: Inside Elliot Bay on Ebb Tide			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-31a, 31b, 34, 35a, 36, 37, 37a-c	4-12	Source Control
2	SC-29	4-12	
3	SC-27	4-12	
4	SC-26a & 26b	4-12	

Table 4-10. Elliot Bay

Intent is to keep oil from leaving Elliot Bay SOURCE OF OIL: Oil Inside Elliot Bay on Flood Tide			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-31a, 31b, 34, 35b, & 36	4-12	Source Control
2	SC-39	4-12	Deflection to aid skimmers
3	SC-40a – 40d	4-12	
4	SC-44	4-11	
5	SC-45	4-12	

Table 4-11. Elliot Bay

Intent is to collect as much of the oil as possible in Elliot Bay SOURCE OF OIL: From the North Into Elliot Bay			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-28	4-12	Use only is source of oil is Lake WA
2	SC-25a & 25b	4-12	Use only is source of oil is Lake WA
3	SC-26	4-12	
4	SC-27	4-12	
5	SC-29	4-12	
6	SC-39	4-12	Deflection to aid skimmers
7	SC-31b	4-12	
8	SC-45	4-12	
9	SC-44	4-11	
10	SC-40a – 40d	4-12	

Table 4-12. Elliot Bay

Intent is to collect as much of the oil as possible in Elliot Bay SOURCE OF OIL: From the South Into Elliot Bay			
PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
BOOMING PRIORITIES			
1	SC-40a – 40d	4-12	
2	SC-39	4-12	Deflection to aid skimmers
3	SC-29	4-12	
4	SC-27	4-12	
5	SC-26	4-12	
6	SC-31b	4-12	
7	SC-44	4-11	
8	SC-45	4-12	

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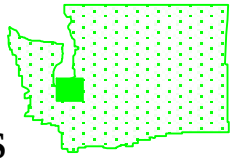
TOC

CENTRAL PUGET SOUND GRP

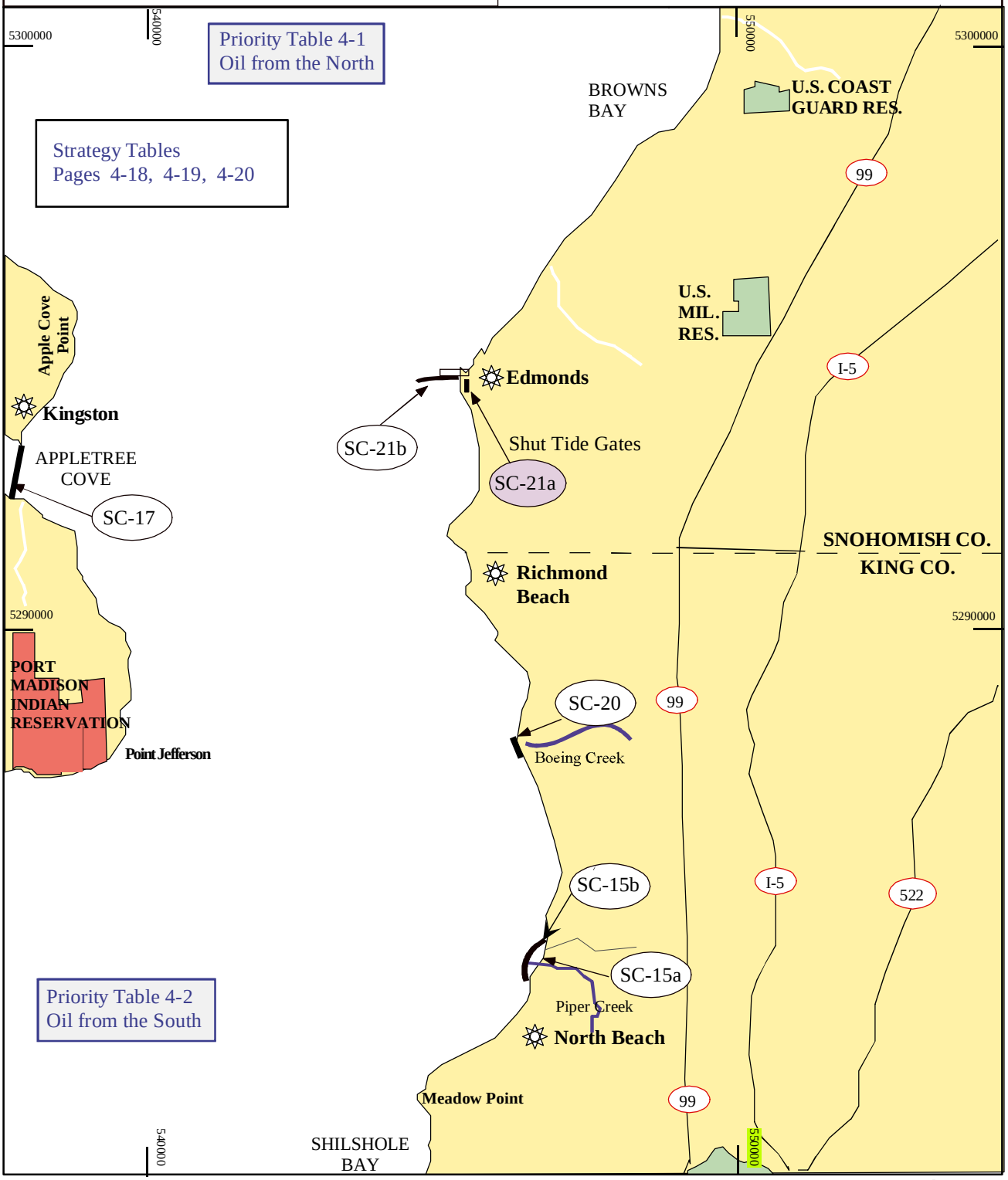


EDMONDS
PROPOSED BOOMING AND COLLECTION STRATEGIES

*** Strategies not drawn to scale ***

Boom
Boat Launch
Town or City
Park or Public Land
Reservation
See Table for Details

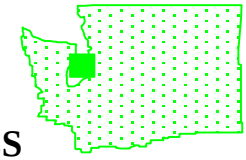
2500 meters 5000 meters
8200 feet 16400 feet
1 inch equals 2500 meters



Port Madison Map Page 4-10

Seattle Map Page 4-12

CENTRAL PUGET SOUND GRP



PORT MADISON
PROPOSED BOOMING AND COLLECTION STRATEGIES

*** Strategies not drawn to scale ***

Boom
Boat Launch
Town or City
Park or Public Land
Reservation
See Table for Details

2500 meters 5000 meters
8200 feet 16400 feet
1 inch equals 2500 meters

Strategy Tables
Pages 4-17, 4-18, 4-19, 4-20, 4-29

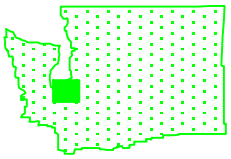
KITSAP COUNTY
Hansville Rd.
Vinland
PORT MADISON INDIAN RESERVATION
Indianola
Miller Bay
SC-13c
SC-13b
SC-13a
U.S. NAVAL RESERVATION.
Poulsbo
LIBERTY BAY
SC-14b
SC-14a
SC-22b
SC-22c
SC-22a
Keyport
U.S. NAVAL RESERV.
SC-22d
Point Bolin
Agate Pass
Priority Table 4-5
Oil through Agate Pass
to Port Orchard and Liberty Bay
PORT MADISON
SC-16
SC-18
Port Madison
Phelps Rd.
Manzanita Bay
SC-63b
SC-63a
Arrow Point
Battle Point
PORT ORCHARD
SC-12
SC-64
Brownsville
Crouch Creek
Burke Bay
Bainbridge Island
Miller Rd.
University Point
SC-11
Fletcher Bay
Priority Table 4-6
Oil from Sinclair Inlet
to Port Orchard
Winslow
Baker Creek
Silverdale
Clear Creek
SC-8a
SC-9
SC-8b
DYES INLET
North Central Valley Road
5290000
5280000
5300000
3
104
305
303

Edmonds Map Page 4-9

Seattle Map Page 4-12

Bremerton Map Page 4-11

CENTRAL PUGET SOUND GRP



BREMERTON
PROPOSED BOOMING AND COLLECTION STRATEGIES

*** Strategies not drawn to scale ***

Boom
Town or City
Park or Public Land
See Table for Details

2500 meters 5000 meters
8200 feet 16400 feet
1 inch equals 2500 meters

Port Madison Map
Page 4-10

DYES INLET
NAVAL DEPOT
SC-7a
SC-7d
SC-7b
SC-7c
ROCKY POINT
OSTRICH BAY
Chico Creek
NAVAL RESERVATION
5270000
SC-2a
5300000
SC-2b
Illahee State Park
303
Bainbridge Island
SC-43d
Point White Drive
SC-44
Blakely Harbor
RICH PASSAGE
5270000
PORT ORCHARD
SC-43a
SC-43b
Manchester State Park
SC-43c
Bremerton
Puget Sound Naval Shipyard
SC-23
SC-1
SC-4
SINCLAIR INLET
Port Orchard
166
PUGET SOUND
SC-6
Ross Point
SC-3
160
Gorst
SC-5
SC-41a
Yukon Harbor
SC-41b
3
Blackja ck Creek
16
KITSAP COUNTY
160
Southworth
Curley Creek
5260000
Banner Road Se
5260000
COLVOS PASSAGE
16
5300000

Priority Table 4-3
Oil from inside Sinclair and/or Dyes Inlet

Priority Table 4-4
Oil through Rich Passage to Sinclair and Dyes Inlet

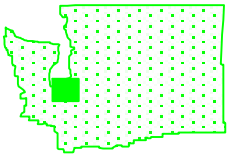
Seattle Map Page 4-12

Strategy Tables
Pages 4-16, 4-17, 4-20, 4-24

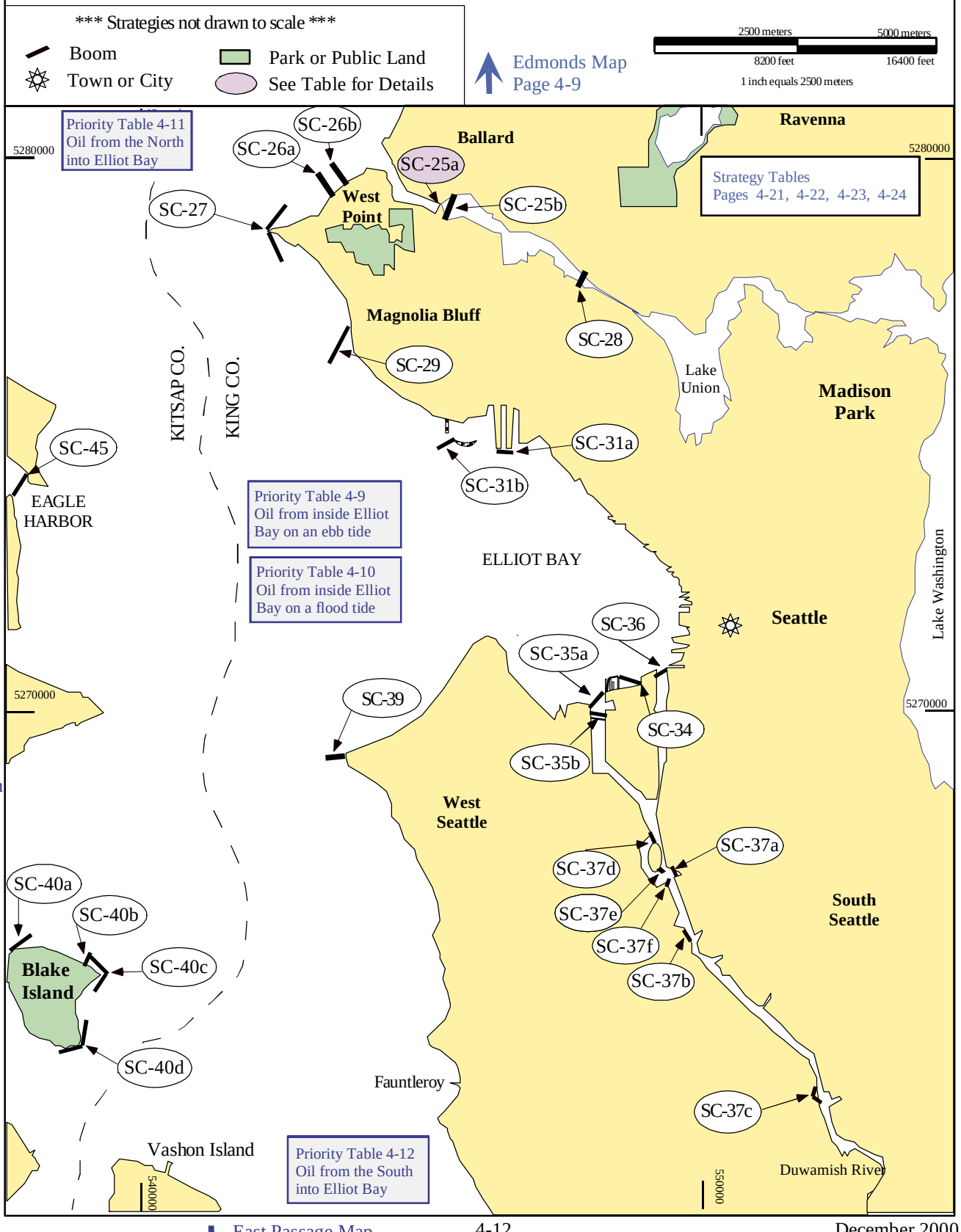
East Passage Map Page 4-13

Gig Harbor Map
Page 4-14

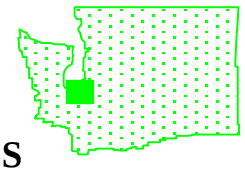
CENTRAL PUGET SOUND GRP



SEATTLE
PROPOSED BOOMING AND COLLECTION STRATEGIES



CENTRAL PUGET SOUND GRP



EAST PASSAGE
PROPOSED BOOMING AND COLLECTION STRATEGIES

*** Strategies not drawn to scale ***

Boom
Town or City
Park or Public Land
Boat Launch

2500 meters 5000 meters
8200 feet 16400 feet
1 inch equals 2500 meters

Seattle Map
Page 4-12

Bremerton
Map
Page
4-11

Gig
Harbor
Map
Page
4-14

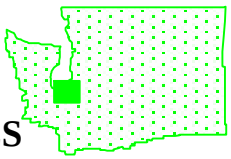
Strategy Table
Page 4-25

KITSAP CO.
KING CO.
5400000
5250000
5550000
5240000

Vashon Island
Three Tree Point
Burien
Tukwila
PUGET SOUND
Judd Creek
Tramp
Harbor
Des Moines
Midway
Maury Island
SC-51
Quartermaster
Harbor
SC-50
Dockton
SC-49b
SC-49a
Manzanita
SC-49c
EAST PASSAGE
Saltwater
State Park
Poverty
Bay
Redondo

Commencement Bay Map
Page 4-15

CENTRAL PUGET SOUND GRP



GIG HARBOR
PROPOSED BOOMING AND COLLECTION STRATEGIES

*** Strategies not drawn to scale ***

Boom

Town or City

Park or Public Land

2500 meters 5000 meters

8200 feet 16400 feet

1 inch equals 2500 meters

Bremerton Map
Page 4-11

Strategy Tables
Pages 4-28, 4-29, 4-30, 4-31

Olalla Valley Road Se

5360000

Burleypolalla Rd

16

Olalla Bay

SC-61

East Passage Map Page 4-13

KITSAP COUNTY
PIERCE COUNTY

5250000

KING CO.

Vashon Island

Burley Lagoon

SP-7

302

Minter Creek

Elgin

SP-6b

SP-6a

Glencove

HENDERSON BAY

Cresent Valley Drive Se

Point Richmond

SC-59b

Hallstrom Drive

SC-59a

Spring Beach

Gig Harbor

SP-8b

Lay Inlet

SP-8c

SP-10a

SP-8d

Raft Island

Rosedale St.

SC-58b

DALCO PASSAGE

SC-58a

SC-62a

SC-62b

SP-10b

Cuts Island

SP-8e

SP-8a

5240000

16

Point Defiance Park

SP-11

Artondale

Tacoma

40th St. Nw

SP-13d

Forest Beach

SP-13c

SP-13b

Hale Passage

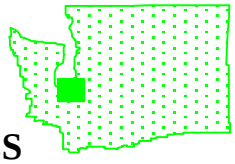
SP-13a

THE NARROWS

Commencement Bay Map Page 4-15

TOC

CENTRAL PUGET SOUND GRP



COMMENCEMENT BAY
PROPOSED BOOMING AND COLLECTION STRATEGIES

*** Strategies not drawn to scale ***

Boom
Town or City
Park or Public Land
See Table for Details

2500 meters 5000 meters
8200 feet 16400 feet
1 inch equals 2500 meters

East Passage Map
Page 4-13

Gig Harbor Map Page 4-14

Priority Table 4-8
Oil in the Narrows
tide ebbing

KING CO.
PIERCE CO.

5240000
5400000
5690000
5230000

Dash Point
State Park

Priority Table 4-7
Oil from Commencement Bay

SC-55 (a-r)

COMMENCEMENT
BAY

509
99
5

Tacoma

Hylebos
Blair
Sitcum
Thea Foss
St. Paul
Middle e
Puyallup W aterway

a
b
c
d
e
f
g
h
i,j
k
l
m
n
o
p
q
r

KING CO.
PIERCE CO.

Puyallup River

Strategy Tables
Pages 4-26, 4-27, 4-28

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-1	Field tested 6/97 (5)	Bremerton Naval Shipyard	Deflection - Deflect oil from entering the head of Sinclair Inlet	2000'	Use shore anchor at high tide. Use pilings to anchor boom from west end of PSNS; extend out to anchor system or tend with boat.	Bremerton Naval Shipyard - has boom to deploy from their waterfront	Naval shipyard, Bremerton Yacht Club, Lyons Park, Downtown City Park	Waterfowl, shorebird & seabird concentrations
SC-2a	Field visit 6/94 (3)	Illahee	Exclusion - Keep oil out of creek	100'	Place boom across mouth of unnamed creek	Illahee State Park	Road access via Illahee Rd	Waterfowl & salmonids
SC-2b	Field visit 6/94 (3)	Port Orchard shoreline / Illahee State Park	Exclusion - Keep oil off shoreline	2200'	Anchor boom from SE shore to mooring buoys then to dock and into NE shore at the bulkhead	Illahee State Park	Illahee State Park boat launch	State Park beaches
SC-3	Field tested 6/97 (5)	Port Orchard Marina	Deflection/ Collection - Prevent oil from reaching shoreline of Sinclair Inlet	2500'	Anchor boom along the east edge of marina dock and extend out at angle toward reflector markers. Collect at dock with vac trucks.	Port Orchard Marina / Fuel dock	Port Orchard Marina, Bremerton Yacht Club, Naval Shipyard	Waterfowl, shorebird & seabird concentrations
SC-4	Field visit 6/94 (3)	Blackjack Creek	Exclusion - Keep oil out of creek	200'	Close off mouth of creek - stake boom to the flat; tide condition dependent - Shallow deploy from road	Bay Ford - Port Orchard Marina	Port Orchard Marina, Bremerton Yacht Club, road access to the site	Waterfowl concentrations
SC-5	Field tested 8/96 (6)	Sinclair Inlet head	Deflection / Collection - Prevent oil from entering inlet	3000'	Apex at outermost log buoy, adjust leg angle to make chevron - Need (12) 70-100lb anchors	Port Orchard Marina (fuel)	Port Orchard Marina, Bremerton Yacht Club, road access to the site	Waterfowl, shorebird & seabird concentrations - High Priority
SC-6	Field tested 6/97 (5)	Ross Point	Exclusion - Protect shoreline from oil	2200'	Depending on direction of tidal flow, secure one end of boom to beach on east or west side of point; extend out to deflect away from point. Boom must be tended by boat.	Port Orchard Marina (fuel)	Port Orchard Marina, Bremerton Yacht Club. Road access possible to point	Waterfowl & shorebird concentrations, smelt spawning area
SC-7a	Field visit 6/94 (3)	Mud Bay	Exclusion - Keep oil out of bay	1000'	Place chevron w/ apex to the North - Need land and (4) 70lb anchors	Bremerton Naval Hospital (helo pad)	Boat access	Sensitive nesting species, smelt and sand lance spawning area

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-7b	Field visit 6/94 (3)	Ostrich Bay	Exclusion - Keep oil out of bays	3500'	Form chevron at mouth of Ostrich Bay anchored to dock at Elwood Pt. and to East shore - Need (1) 70lb anchor at apex	Bremerton Naval Hospital (helo pad)	Boat access	Sensitive nesting species, smelt and sand lance spawning area
SC-7c	Field visit 6/94 (3)	Oyster Bay	Exclusion - Keep oil out of bays	500'	Close off mouth to Oyster Bay w/ 250' sections anchored to boulders, trees & pilings	Bremerton Naval Hospital (helo pad)	Boat access	Sensitive nesting species, smelt and sand lance spawning area
SC-7d	Field visit 6/94 (3)	Chico Creek	Exclusion - Prevent oil from entering creek	200'	Place boom across mouth of Chico Creek	Bremerton Naval Hospital (helo pad)	Road access via Hwy 3	Salmon
SC-8a	Field visit 6/94 (3)	Clear Creek	Exclusion - Prevent oil from entering creek estuary	200'	Close off flat in front of creek (two culverts where road crosses creek) High water = deploy from boat; Low water = from road	Silverdale	Boat and vehicle from Silverdale, Bucklin Hill Rd goes over Clear Creek	Waterfowl concentrations; wetlands upstream
SC-8b	Field visit 6/94 (3)	Clear Creek	Exclusion - Prevent oil from entering lagoon	100'	Close off small lagoon to SE	Silverdale	Boat from Silverdale	Waterfowl concentrations; wetlands
SC-9	Field visit 6/94 (3)	Baker Creek	Exclusion - Prevent oil from entering creek estuary	200'	Close off flat in front of creek; High water deploy from boat, Low water from road	Silverdale	Boat and vehicle from Silverdale, Traceyton Beach Rd goes over mouth of creek	Waterfowl concentrations
SC-11	Field visit 6/94 (3)	Fletcher Bay	Exclusion - Keep oil out of Fletcher Bay	600'	Close off mouth of Fletcher Bay w/ 2 chevrons - Need (4) 45-70lb anchors & land anchors	Vessel and/or Brownsville	Boat launch at Brownsville, shoreline on both sides private	Protect fish & wildlife resources
SC-12	Field visit 6/94 (3)	Burke Bay	Exclusion - Prevent oil from entering Burke Bay	1500'	Angle from sandy beach to opposite shore, can collect oil on beach. Alternate strategy - Place 500' from shore to NW corner of marina and 1000' from SW corner to opposite shore.	Brownsville Marina	Boat access from Brownsville marina, road access at bridge	Blue heron rookery on South shore and wetlands in bay
SC-13a	Field tested 9/96 (4)	Marsh east of Indianola (47'44.85"N; 122'29.44"W)	Exclusion	1000'	Place boom across marsh entrance	Indianola	Boat access from Mller Bay	Sensitive nesting species, waterfowl concentrations; Pt. Madison tribal land

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-13b	Field tested 9/96 (4)	Miller Bay	Exclusion - prevent oil from entering bay	800'	Anchor boom at south end of south shore to close off entrance.	Boat launch area within Miller Bay	Boat access from Miller Bay, East of Indianola, or private launch in Suquamish	Great Blue Heron and waterfowl concentrations; salmonid concentrations
SC-13c	Field tested 9/96 (4)	Inner Miller Bay	Exclusion - prevent oil from entering creek mouth	300'	Close off creek mouth.	Boat launch area within Miller Bay	Boat access from Miller Bay, East of Indianola, or private launch in Suquamish	Great Blue Heron and waterfowl concentrations; salmonid concentrations
SC-14a	Field visit 6/94 (3)	Liberty Bay	Diversion/ Collection - Divert and collect oil before it can reach Liberty Bay	500'	Angle north leg toward the east to collect oil in North of bay.	Keyport Harbor	Boat access from Keyport Marina, Naval Base, fuel dock at Poulsbo	Protect fish & wildlife resources in inner Liberty Bay
SC-14b	Field visit 6/94 (3)	Liberty Bay	Diversion/ Collection - Divert and collect oil before it can reach Liberty Bay	500'	Locate south leg just West of power lines and East of the house w/ flagpole flying several state flags - Collect oil at small private ramp (caution pipeline area)	Keyport Harbor	Boat access from Keyport Marina, Naval Base, fuel dock at Poulsbo	Protect fish & wildlife resources in inner Liberty Bay
SC15a	Field visit 3/97 (1)	Piper Creek (47 42.77" N; 122 22.91" W)	Exclusion - Keep oil out of Piper Creek estuary	200'	Close off both culverts where RR crosses creek.	Carkeek Park - Parking lot	Road access from Shilshole Bay or Edmonds, difficult to reach by land	Protect salmon. Active public watershed enhancement area. Note - oil only will enter under extreme tide/flow conditions
SC-15b	Field visit 3/97 (1)	Piper Creek (47 42.77" N 122 22.91" W)	Exclusion - Keep oil out of Piper Creek estuary and intertidal area	1000'	Secondary Strategy - Deploy chevron at creek mouth. Note - oil will enter only under extreme tide/flow conditions. Deploy boom from land at low water.	Richmond Beach park parking lot	By boat Shilshole Bay or Edmonds	Protect salmon. Active public watershed enhancement area. Note - oil only will enter creek under extreme tide/flow conditions

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-16	Field visit 6/94 (3)	Inlet at Port Madison	Diversion / Collection - Keep oil out of inlet	1000'	Angle from Pt. Monroe sand spit and West shore to divert oil away from inlet - Collect oil w/ portable skimmers	Fay Bainbridge State Park (boat launch)	Boat launch at Fay Bainbridge State Park; private and public access near area for vehicles	Protect fish & wildlife resources
SC-17	Field Tested (1)	Appletree Cove 47 47' 36" N 122 29'55" W	Exclusion/Collection - Prevent oil from entering Appletree Cove mud flats and intertidal area	1500'	Attach 200 feet of intertidal to south end of cove at treeline east of retaining wall. Connect with 1300 feet of harbor boom which should be attached to the south end of the breakwall. (variation, attach to piling first and then to breakwall. 3 anchors should be placed in and 3 outside of boom. Collection can take place in cusps that form between anchors.	Kingston Marina	Accessible from Kingston Marina, road access around cove. Note - beach to South is a natural collection area	Crab larvae / adults
SC-18	Field visit 6/94 (3)	Inlet at Port Madison	Deflection / Collection - Prevent oil from entering Port Madison	1200'	Angle on East and West shore of Port Madison to divert oil to West shore for collection w/ portable skimmers	Fay Bainbridge State Park (boat launch)	Boat launch at Fay Bainbridge State Park; private and public access for vehicles	Protect fish & wildlife resources
SC-20	Field tested 3/97 (1)	Boeing Creek (47 44.99" N 122 23.08" W)	Exclusion - Prevent oil from entering creek mouth	100' - increase to 500' at low water &/or high creek flow	Place weir dam or other partial dam at culverts to prevent oil/tidal water from entering but allowing creek flow out. Will need sandbags, cement, plywood, etc. Boom as last resort.	Richmond Beach park parking lot	Boat access from Edmonds or Shilshole Bay; land access possible	Protect salmon and Carkeek watershed program area
SC-21a	Field visit 3/97 (1)	Edmonds Wildlife Sanctuary	Exclusion - Keep oil out of wildlife sanctuary	N/A	Shut tide gates if the threat of oiling exists. Tide gate is 0.3 mile south of Dayton St., 75' east of RR tracks. Gate has chain/lock - key at Edmonds Engineering Dept. (also can be cut).	Edmonds Marina	Edmonds Marina	Sensitive nesting species, Harbor Seals, California Sea Lions

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-21b	Field visit 10/96 (2)	Unocal Dock	Collection	2000'	Extend boom along & past existing pier - collect at pier. Boom reel already at end of pier.	Edmonds Marina; Richmond Beach	Boat access from Edmonds Marina	Kelp beds to north; sensitive resources north and south
SC-22a	Field visit 6/94 (3)	Keyport Lagoon	Exclusion - Keep oil out of lagoon	200'	Close causeway and add 200' of protective boom in front of causeway	Keyport Naval Base	Access by vehicle from downtown Keyport, boat access from Naval Base or fuel dock at Poulsbo	Pigeon Guillemots
SC-22b	Field visit 6/94 (3)	Entrance to Liberty Bay	Diversion/ Collection - Prevent oil from entering Liberty Bay	1000'	Anchor at launch ramp, collect oil between launch ramp and stone rip-rap. Caution - Pipeline Area (1 of 3 lengths)	Keyport Naval Base	Vehicle access from downtown Keyport, boat access from Naval Base or Poulsbo fuel dock	Marine birds, waterfowl, & baitfish spawning beaches
SC-22c	Field visit 6/94 (3)	Entrance to Liberty Bay	Diversion/ Collection - Prevent oil from entering Liberty Bay	1000'	Anchor at launch ramp, collect oil between launch ramp and stone rip-rap. Caution - Pipeline Area (2 of 3 lengths parallel to SC-22b)	Keyport Naval Base	Vehicle access from downtown Keyport, boat access from Naval Base or Poulsbo fuel dock	Marine birds, waterfowl, & baitfish spawning beaches
SC-22d	Field visit 6/94 (3)	Entrance to Liberty Bay	Diversion/ Collection - Prevent oil from entering Liberty Bay	1000'	Anchor at launch ramp, collect oil between launch ramp and stone rip-rap. Caution - Pipeline Area (2 of 3 lengths parallel to SC-22b)	Keyport Naval Base	Vehicle access from downtown Keyport, boat access from Naval Base or Poulsbo fuel dock	Marine birds, waterfowl, & baitfish spawning beaches
SC-23	Field tested 8/96 (6)	Bremerton Naval Shipyard	Deflection / Collection - Prevent oil from going up Dyes Inlet	1000' (untended) or 2000' (boat tended)	Anchor to cement pilings under ferry terminal; run boom out at a SW angle. Deflect oil into cement pocket next to shipyard property - Collect w/ vac truck. Note - notify ferry control tower to have captains come in and out on a slow bell	Bremerton Naval Shipyard & Ferry dock parking lot	Access by vehicle and vessel from the shipyard, by ship from the Bremerton Yacht Club	Waterfowl concentrations

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-25a	No field visit/ test	Chittenden Locks - Salmon Bay	Exclusion - Keep oil in lakes		Notify Lock Master at 206-783-7000. Lock master will close the locks, fish ladder, and spillway gates and await further guidance from Unified Command.	Oil facilities just above locks	Roads on both sides of channel	Protect fish & wildlife resources
SC-25b	No field visit/ test	Time Oil Co.	Prevent oil from reaching Locks	1200'	Boom across canal from Time Oil Co. boom to solid shoreline beyond the wooden pier on north shoreline.	Time Oil Co.	Roads on both sides of canal	Protect the locks, fish and wildlife.
SC-26a	Field visit 7/95 (7)	South of Ship Canal	Diversion	1000'	Use diversion boom - Angle NNE from the points below the ship canal	Shilshole Bay Marina	Road access on Metro property (lower boom); boat for upper boom	Kelp and rockfish eel grass habitat just south of ship canal entrance
SC-26b	Field visit 7/95 (7)	South of Ship Canal	Diversion	1000'	Use second diversion boom south of SB 2C-26a - Angle NNE from the points below the ship canal	Shilshole Bay Marina	Road access on Metro property (lower boom); boat for upper boom	Kelp and rockfish eel grass habitat just south of ship canal entrance
SC-27	Visit 5/17/00	West Point 47 39 52 122 26 10	Diversion or Deflection (depending on tide)	1000'	Angle boom close to shore to keep oil from coming back around point, enhance natural deflection of point, can pivot boom around point depending on oil direction and tide	Shilshole Bay Marina	Boat only - use Armeni ramp, take exit 163 off I-5, follow to Harbor Is. exit, go right 1.1 miles	Protect kelp beds to the N & S and rock fish habitat
SC-28	Visit 5/17/00	Lake Washington Ship Canal 47 39 099 122 21 624	Exclusion/ Collection - Keep oil out of Puget Sound	300'	Boom across canal; use skimmer along boom; anywhere along canal that is appropriate/accessible	Salmon Bay Marina; bridge - lots	Roads on both sides of canal - deploy boom by boat only	Protect salmon migration area
SC-29	Visit 5/17/00	Magnolia Bluff 47 38 27 122 24 48	Deflection	1000'	Angle boom SW from shore; angle dependent on wind direction; deflect to skimmers	Shilshole, or Magnolia Park	Boat only - use Armeni ramp (see SC-27)	Protect kelp and eelgrass areas to the North
SC-31a	Visit 5/17/00	Pier 91 47 37 34 122 22 52	Exclusion - Prevent oil from reaching Puget Sound	1000'	Boom around source and where oil is suspected or observed to come out - Spill from Elliot Bay: put boom around pier face	Pacific Northern Oil docks	Deploy boom by boat only - use Armeni ramp (see SC-27)	General protection of fish and wildlife resources

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-31b	Field visit 7/95 (7)	Elliot Bay Marina	Deflection - keep oil out of adjacent kelp beds	1000'	Anchor to west end of marina breakwater and extend to SW, anchoring in approx. 45' of water.	Elliot Bay Marina; Pier 91	Elliot Bay Marina	Kelp beds to west of Elliot Bay Marina
SC-34	Field visit 10/96 (8)	Harbor Island	Exclusion - Prevent oil from entering sound	3000'	Close off docks at the N end of Harbor Is. - Rainier, Todd Shipyard to shoreline at base of Crowley Pier 17	Rainier, TODD facilities	Rainier, TODD facilities	General protection of fish and wildlife resources
SC-35a	Field tested 9/95 (9)	Harbor Island - West Waterway	HIGH CURRENTS: Exclusion or diversion/ collection - prevent oil from entering Puget Sound	3000'	Close off West Waterway, or use diversion from shore to mid-channel; collect with portable skimmers/vac trucks. Entrainment likely.	Rainier, Todd, Arco facilities (Arco has 2,500' boom on reel)	Rainier, Todd, Arco facilities	Puget Sound resources
SC-35b	Field tested 9/95 (9)	Harbor Island - West Waterway	LOW CURRENT: Exclusion/ collection	1200'	Deploy boom from Arco warehouse north or south cleat to old fire station pier using rolling bridle. Collect with skimmers/vac trucks. Entrainment NOT likely.	Rainier, Todd, Arco facilities (Arco has 2,500' boom on reel)	Rainier, Todd, Arco facilities	Puget Sound resources
SC-36	No field visit/ test	Harbor Island - East Waterway	Exclusion or Diversion and Collection - Prevent oil from entering Puget Sound	3000'	Close off East Waterway, or use diversion to shore with boom that goes to mid-channel; collect with portable skimmers/vac trucks; allow for partial vessel traffic access	Harbor Island	Numerous access points from Harbor Island	
SC-37a	Field visit 6/94 (3)	SE of Kellogg Island	Exclusion - Prevent oil from entering small inlet	300'	Boom across inlet SE of Kellogg Island; existing pre-deployed boom needs repair	Port of Seattle	Port of Seattle (728-3732	Wetland habitat
SC-37b	Field visit 6/94 (3)	Lone Star Cement Dock	Exclusion - Keep oil out of marsh area	1000'	Place boom outside of cement piled dock		Lone Star Cement Co.	Wetland, bird rookery
SC-37c	Field visit 6/94 (3)	Northwest Cooperage (barrel factory)	Exclusion - Keep oil out of small inlet	200'	Place boom at mouth of inlet behind barrel factory		NW Cooperage	Wetland habitat

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-37d	Field visit 6/94 (3)	Kellogg Island	Exclusion / Collection - Protect backwaters west of Kellogg Island	1600'	1600' on North entrance, anchor to pilings, boom around small island, can also connect to barges	Ideal Cement - across shore from Crowley	Ideal Cement - across shore from Crowley	Heron nesting area, waterfowl, only developed area in waterway
SC-37e	Field visit 6/94 (3)	Kellogg Island	Exclusion / Collection - Protect backwaters west of Kellogg Island	500'	Boom gaps in barges to protect East side of island	Ideal Cement - across shore from Crowley	Ideal Cement - across shore from Crowley	Heron nesting area, waterfowl, only developed area in waterway
SC-37f	Field visit 6/94 (3)	Kellogg Island	Exclusion / Collection - Protect backwaters west of Kellogg Island	1000'	SE corner angle 1000' section off end of Ideal Cement dock to divert oil into main channel (reverse direction when tide changes)	Ideal Cement - across shore from Crowley	Ideal Cement - across shore from Crowley	Heron nesting area, waterfowl, only developed area in waterway
SC-39	Field visit 6/94 (3)	Alki Point	Deflection - Deflect oil away from shore toward skimmers	1000'	Pivot boom around point depending on current - Need to tend end of boom w/ boat	US Coast Guard lighthouse	Access by boat or road	Public Beaches
SC-40a	Field test 6/4/99	Blake Island nw corner 47 32 35 N 122 30 19 W	Deflection - Deflect oil away from shore	1000'	Pivot boom around point depending on current - Need to tend end of boom w/ boat	Harbor Island	Access by boat	Sensitive nesting species, eelgrass, piniiped feeding area, hardshell clams along entire S shore, State Park
SC-40b	Field visit 6/4/99	Blake Island marina 47 32 35 N 122 30 19 W	Deflection - Deflect oil away from shore	500'	Place boom across mouth of Harbor, anchor to break water	Harbor Island	Access by boat	same as SC-40a
SC-40c	Field visit 6/4/99	Blake Island East Site 47 32 35 N 122 30 19 W	Deflection - Deflect oil away from shore	1000'	Pivot boom around point depending on current - Need to tend end of boom w/ boat	Harbor Island	Access by boat	same as SC-40a

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-40d	Field visit 6/4/99	Blake Island SE corner	Deflection - Deflect oil away from shore	2000'	Pivot boom around point depending on current - Need to tend end of boom w/ boat	Harbor Island	Access by boat	same as SC-40a
SC-41a	Field visit 6/94 (3)	Yukon Harbor / Curley Creek 47 31'52" w 122 32 47 n	Exclusion - Prevent oil from entering marsh @ high tide	100'	Place boom across creek at bridge, deploy from road	Southworth or Manchester	Road access	Marsh area upstream
SC-41b	Field visit 6/94 (3)	County Park north of Southworth (at Harper) 47 31 13w 122 31 08n	Exclusion - Keep oil out of inlet	1000'	Close off mouth of inlet, anchor to pilings on East shore and road guard-rail on West shore. Low Priority	Manchester boat launch	Harper Co. Park small boat launch @ high tide	Protect county park and eelgrass beds
SC-43a	Field visit 6/94 (3)	Clam Bay / NMFS Fish Net Pens 47 34 53n 122 32 43w	Exclusion/ Collection - Prevent oil from reaching intertidal zone of Clam Bay and NMFS Fish Net Pens	3000'	Anchor 3,000' to North side of NMFS pier, run around NMFS net pens, then angle South to opposite shore.	Manchester or Bremerton	Roads on the inside of Clam Bay	Waterfowl concentration; Endangered sockeye, salmon net pens at NMFS pier (but not commercial pens); Fish ladder at Beaver Creek
SC-43b	Field visit 6/94 (3)	Clam Bay / NMFS Fish Net Pens	NMFS Fish Net Pens	1500'	Surround NMFS fish net pen with 1,500' for extra protection. Need (12) 70lb anchor systems. Note - doesn't address commercial net pens.	Manchester or Bremerton	Roads on the inside of Clam Bay	Endangered sockeye, salmon net pens at NMFS pier
SC-43c		Little Clam Bay	Exclusion		Shut down tide gate during incoming tide	Manchester or Bremerton	Roads on the inside of Clam Bay	Endangered salmon
SC-43d	Field visit 6/94 (3)	Lynnwood Center / Rich Passage	Collection - Enhance natural collection site	1500'	Run boom from North shore to collect oil in eddy - Need (8) 70lb anchors, vac trucks, skimmers	Manchester Fuel depot	Road access from Pt. White Dr.	General protection of fish and wildlife resources
SC-44	Field visit 6/94 (3)	Blakely Harbor	Exclusion - Keep oil out of the back of Blakely Harbor	1500'	Close at mid-harbor - Need large land anchors, Low Priority	Eagle Harbor marina & County Park	Good road access along the S. end	Smelt spawning area
SC-45	Field visit 6/94 (3)	Eagle Harbor	Exclusion	3000'	close off harbor at ferry dock; anchor at ferry dock and pilings just East of old creosote plant	Winslow Ferry	Access by boat or roads north and south ends of harbor	Smelt spawning habitat

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-49a	Field visit 8/94 (10)	Quarter-master Harbor, south end.	Deflection/ Collection/ Exclusion - Keep oil out of harbor	2000'	Angle 2000' section SW from sand beach near Manzanita, collect oil at beach w/ vac trucks. Need - (12) 100 lb anchors.	Tacoma Note: Pier 23 National Guard landing craft could bring over vac trucks	Roads on both sides; quickest access - Point Defiance	Highly sensitive area: Herring, smelt, sandlance, waterfowl & seabird concentrations, Great Blue Heron colony, Scoters
SC-49b	Field visit 8/94 (10)	Quarter-master Harbor, south end.	Deflection/ Collection/ Exclusion - Keep oil out of harbor	6076' (1 n mile)	(weather dependent) 1 N mile section continue SW to shore (to be used in conjunction enhanced skimming)	same as above	same as above	Same as above
SC-49c	Field visit 8/94 (10)	Quartermaster Harbor, south end	Deflection/ Collection - Keep oil out of harbor	4000'	Angle boom SE from West shore, tend end of boom w/ boat, collect oil w/ portable skimmers (strategy best implemented by boat)	Tacoma Note: Pier 23 National Guard landing craft could bring over vac trucks	Road to SW side of harbor, boat access - Burton & Dockton Co. Park boat ramps	Same as above
SC-50	Field visit 8/94 (10)	Quartermaster Point - Point N. of Dockton	Diversion/ Collection - Keep oil out of the North end of Quartermaster Harbor	2000'	Anchor at the large dock w/ yellow building; angle out to the SW to trap oil at flood tide; collect w/ portable skimmers & vac trucks	Dockton Co. Park dock & boat ramp	Dockton Road S.W.; quickest access - Point Defiance	Same as above
SC-51	Field Test 4/17/97	Quatermaster Harbor, boat ramp @ Burton 47 23.095 N 122 31.113 W	Deflection/ Collection/ Exclusion - Prevent oil from reaching N end of harbor, exclude drainage area N of Dockton	2100'	Deploy 2100 feet of boom from spit on the inner harbor entrance to beach on opposite shore	Boat ramp parking lot NW side of harbor	By boat or ferry to Vashon and then ramp parking lot NW side of harbor	Same as above

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-55a	Field visit 9/94 (13)	Thea Foss Waterway 47 15 69 N 122 26 17 W	Deflection/ Collection/ Containment - Keep oil in or out of waterway	1000'	Deploy from Superior Oil Dock at a 35 degree angle.	Old fire dept. building and dock near 11th St bridge and opposite Token Marina	Land access from Superior Oil. Road access on both sides of waterway	Salmonids in wetlands and creeks at head of waterway
SC-55b	Field visit 9/94 (13)	Middle Waterway 47 15 45 N 122 25 51 W	Exclusion - Keep oil in or out of waterway	500'	Boom straight across waterway from Foss dock on West shore to end of gravel beach on East shore.	Foss Facility has dock w/ 100,000 lb capacity and a launch ramp	Road access to both sides of waterway (Private Property)	Salmonids in wetlands and creeks at head of waterway
SC-55c	Field visit 9/94 (13)	Middle Waterway 47 15 45 N 122 25 51 W	same as previous	300'	Backup SC-55b with boom just South of green building across to East shore	same as previous	same as previous	same as previous
SC-55d	Field visit 9/94 (13)	St. Paul Waterway	Exclusion - Keep oil in or out of waterway	300'	Angle from pilings to dolphins.	Simpson Plant	Road access to both sides of waterway (Private Property)	Same as above + mudflat N of waterway is a Super Fund restoration site
SC-55e	Field visit 9/94 (13)	St. Paul Waterway	Deflection - Deflect from waterway	1000'	Waterway spill: place deflection boom off North point to protect mudflats	Simpson Plant	Road access to both sides of waterway (Private Property)	Same as above + mudflat N of waterway is a Super Fund restoration site
SC-55f	Field visit 9/94 (13)	Sitcum Waterway	Exclusion - Keep oil in or out of waterway	1500'	Angle SW from end of concrete abuttment on East shore to pilings on West shore	Port of Tacoma Office, head of Sitcum Waterway	Access through gate on W shore	Salmonids in wetlands and creeks at head of waterway; Puget Sound resources
SC-55g	Field visit 9/94 (13)	Mouth of Blair Waterway 47 16 45 N 122 24 44 W	Exclusion - Keep oil in or out of waterway	1300'	Angle from tip of pier 2 to the opposite shore at mouth of waterway.	Port of Tacoma Office, head of Sitcum Waterway	Road access to both sides of waterway (Private Property)	Salmonids in wetlands and creeks at head of waterway
SC-55h	Field tested 99	Inner Blair Waterway	Exclusion - Keep oil in or out of waterway	1000'	Place chevron just SE of where 11th St. bridge was & just NW of Lincoln Ave.	Port of Tacoma Office	Road access to both sides of waterway (private property)	Puget Sound resources

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-55i	Field tested 99	Inner Blair Waterway	Exclusion - Protect mitigated wetland area SE of 11 st bridge	500'	For small spills in waterway, place boom across mouth of mitigation area.	Port of Tacoma Office	same as previous	Wetland
SC-55j	Field tested 99	Inner Blair Waterway	Collection - Keep oil in waterway	1000'	For large spills in waterway, use boom to deflect oil into the wetland mitigation area for collection.	Port of Tacoma Office	same as previous	Puget Sound resources
SC-55k	Field tested 99	Inner Blair Waterway	Protect mitigated wetland area between US Oil dock and Linconln Outfall	500'	Place boom across mouth of wetland area	Port of Tacoma Office	Road access to both sides of waterway (private property)	Wetland
SC-55l	Field tested 9/95 (14)	Inner Blair Waterway	Keep oil out of waterway	300'	Place boom around Lincoln Ave. ditch outfall	same as previous	same as previous	Puget Sound resources
SC-55m	Field tested 9/95 (14)	Inner Blair Waterway	Keep oil out of waterway	1000'	Surround SC-55l with a chevron.	same as previous	same as previous	Puget Sound resources
SC-55n	Field tested 9/95 (14)	Inner Blair Waterway	Keep oil in or out of waterway	1000'	Place boom from just SE of Lincoln Ave. ditch outfall to steel pole in parking lot NW of casino	same as previous	same as previous	Puget Sound resources
SC-55o	Field visit 9/94 (12)	Hylebos Waterway	Exclusion - protect mudflat	2000'	Anchor just east of 11th St. bridge on the North side, East to Sound Refining Dock	Olie & Charlie's Marina	Road access via Hwy 509 (Marine View Drive)	Mudflats, waterfowl
SC-55p	Field visit 9/94 (12)	Hylebos Waterway 47 16 44 N 122 23 46 W	Exclusion - protect mudflat	1200'	Anchor just west of 11th St. bridge on the North side, West to buoy "3", then hook back to shore	same as previous	same as previous	Mudflats, waterfowl
SC-55q	Field visit 9/94 (12)	Hylebos Waterway 47 16 59 N 122 22 04 W	Exclusion - Keep oil in or out of waterway	1000'	Anchor from rip-rap at Oxy Chemical to opposite shore just West of Chinook Marina	Oxy Chemical	Road access via main gate at Oxy Chemical	Salmonids in wetlands and creeks at head of waterway. Conservation area (check on ownership)

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SC-55r	Field visit 9/94 (12)	Hylebos Waterway	Exclusion - protect mudflats	3000'	North shore of mouth from Olie & Charlie's Marina out to buoy "1", then back to shore just East of log boom; Need - (8) 60lb anchor systems	Olie & Charlie's Marina	Road access via Hwy 509 (Marine View Drive)	Mudflats, waterfowl
SC-58a	Field visit 8/94 (10)	Gig Harbor 47 19.593 N 122 34.532 W	Exclusion/ Deflection/ Collection - Keep oil out of harbor	1000'	Place chevron across mouth, anchor to dock w/ davit on West side & to East spit w/ land anchor (may be able to use bridle on small lighthouse).	Gig Harbor	Road access to both sides of harbor	Smelt spawning
SC-58b	Field visit 8/94 (10)	same as above	Exclusion/ Deflection/ Collection - Keep oil out of harbor	500'	Angle boom behind chevron (SC-58a) from lighthouse NW to sand beach by private ramp next to flagpole	same as above	same as bove	same as bove
SC-59a	Field visit 8/94 (10)	Spring Beach 47 20.936 N 122 31.698 W	Diversion/ Collection - Prevent oil from flowing further north into Colvos Passage	2000'	Anchor to pilings angle to SW, tend end of boom w/ boat. Collect oil at small group of houses, w/ vac trucks or portable skimmers (Note: Currents are generally northward on all tides)	Tacoma - Point Defiance	Road access to Spring Beach via SW 280th St.	Waterfowl, murres
SC-59b	Field visit 8/94 (10)	Richmond Point 47 22 50 N 122 32 22 W	Diversion/ Collection - Prevent oil from flowing further north into Colvos Passage	2000'	Deploy from beach in N/S direction with boat in J configuration to catch oil. Tend end w/ boat, collect oil in hook w/ portable skimmer	Tacoma - Point Defiance	Road access to point off Hallstrom Dr NW	Waterfowl, murres
SC-61	Field visit 8/94 (10)	Olalla Bay 47 25 22 N 122 32 28 W	Exclusion - Keep oil out of Olalla Bay	600'	Deploy boom as chevron at mouth of bay. Need - (2) 40lb anchors at apex	Olalla Bay boat ramp	Cresent Valley Rd. on South side of bay has public ramp and parking	Waterfowl
SC-62a	Field visit 5/95 (12)	Point Defiance Park 47 18.486 N 122 31.113 W	Exclusion - keep oil away from herring tanks, water intake, and public beach	200'	Deploy boom around herring tank offshore.	Point Defiance	Roads; marina; Vashon ferry dock	Aquarium herring resources offshore; public recreation area. Water intake at 14' depth.

CENTRAL PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES								
Strategy	**Status**	**Location**	**Response Strategy**	**Length of Boom**	**Strategy Implementation**	**Staging Area**	**Site Access**	**Resources Protected**
SC-62b	Field visit 5/95 (12)	same as above	same as above	1000'	Enclose tank, beach, and water intake with chevron extending from boat house to shoreline at west.	Point Defiance	Roads; marina; Vashon ferry dock	same as above
SC-63a	Field visit 6/94 (3)	Manzanita Bay	Exclusion - Prevent oil from entering bay	2000'	Place booms in chevron configuration across mouth of bay; anchor to pilings. Large anchor at apex.	Keyport Naval Base	Boat access from Brownsville Marina, road access at bridge	Protect herring spawning area
SC-63b	Field visit 6/94 (3)	Manzanita Bay	Exclusion - Prevent oil from entering bay	500'	Place boom across East inlet.	Keyport Naval Base	Boat access from Brownsville Marina, road access at bridge	Protect herring spawning area
SC-64	Field visit 6/94 (3)	University Pt. to Keyport	Exclusion - Prevent oil from reaching shore	As much boom as is available to protect as much shoreline as possible	Roving barriers along shore as needed - Need to make best guess as to where oil will landfall, protect most likely landfall area	Keyport Naval Base	Boat access from Brownsville Marina, road access at bridge	Sensitive nesting species & smelt spawning beach

SOUTH PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
SP-6a	Field visit 8/94 (11)	Minter Creek	Exclusion Booming - Keep oil out of creek	1000'	Close off creek with chevron, can use trees on N side of creek as anchors.	Boat launch at Wauna	Land access to Sunrise and Minter Beaches	Minter Creek Hatchery, archeological site and shellfish
SP-6b	Field visit 8/94 (11)	Minter Creek	Exclusion Booming - Keep oil out of creek	500'	Run boom NE/SW along pilings about 1/8 mile upstream from Oyster Co.	same as above	same as above	same as above
SP-7	Field visit 8/94 (11)	Burley Lagoon	Exclusion Booming - Keep oil out of lagoon	2000'	Chevron at entrance to lagoon. Anchor both to powerline tower and NE bridge abutment. Need - (2) 100lb anchors at apex	Purdy	Good road access from Hwy 302	Wildlife, shellfish, juvenile salmon and waterfowl concentration
SP-8a	Field visit 8/94 (11)	Raft Island	Exclusion Booming - Keep oil off island	800'	Boom along bridge	Purdy or Gig Harbor	Road access from bridge, access via private property N. side of Is. and small bay on mainland, road access to E side of Lay Inlet	Clams, harbor seal haulouts and shellfish
SP-8b	Field visit 8/94 (11)	Raft Island	Exclusion Booming - Keep oil off island	2000'	Boom North side of island from large floating dock on Island to small bay near road.	same as above	same as above	same as above
SP-8c	Field visit 8/94 (11)	Raft Island	Exclusion Booming - Keep oil off island	400'	Boom mouth of Lay Inlet	same as above	same as above	same as above
SP-8d	Field visit 8/94 (11)	North end Cuts Island	Exclusion Booming - Keep oil off island	1200'	Place chevron on North end of island	Purdy or Gig Harbor	Boat	Shellfish & State Park, Harbor seal haulout
SP-8e	Field visit 8/94 (11)	South end Cuts Island	Exclusion Booming - Keep oil off island	1200'	Place chevron on South end of island	Purdy or Gig Harbor	Boat	Shellfish & State Park, Harbor seal haulout
SP-10a	Field visit 8/94 (11)	Glen Cove	Exclusion Booming - Keep oil out of cove	1000'	Place chevron across mouth of Glen Cove	Glen Cove boat launch in Wauna	Boat	Cove, shoreline, fisheries

SOUTH PUGET SOUND GRP PROPOSED BOOMING AND COLLECTION STRATEGIES								
Strategy	**Status**	**Location**	**Response Strategy**	**Length of Boom**	**Strategy Implementation**	**Staging Area**	**Site Access**	**Resources Protected**
SP-10b	Field visit 8/94 (11)	Small cove just to S of Glen Cove	Exclusion Booming - Keep oil out of cove	200'	Place chevron across mouth of cove	same as above	same as above	same as above
SP-11	Field visit 8/94 (11)	Horse Head Bay	Deflection Booming - Keep oil out of bay	2000'	Movable deflection boom depending on wind & current - boat tended. Can anchor off N or S shore	Forest Beach or Kopachuck State Park. Boat ramp on SE end of Horse Head Bay	Boat	Fisheries and wildlife (uncertain about resources, may be low priority)
SP-13a	Field visit 8/94 (11)	Wollochet Bay	Deflection/ Collection - Keep oil out of bay	2000'	Anchor to boat ramp near old ferry dock, tend end w/ boat (30" boom in high winds)	Wollochet close to Tacoma Narrows Airport	Road access around entire bay. Private property access to boat ramp for (a)	Herring, smelt and sandlance spawning, juvenile crab & geoduck
SP-13b	Field visit 8/94 (11)	same as above	same as above	2000'	Anchor to cement bulkhead just around point near E Cromwell, tend end w/ boat (30" boom in high winds)	same as above	same as bove	same as bove
SP-13c	Field visit 8/94 (11)	Creeks on E side of Wollochet Bay	Exclusion - Keep oil out of the creek	100'	Exclude both creek mouths on E side w/ chevron formation	same as above	same as bove	same as bove
SP-13d	Field visit 8/94 (11)	Wollochet Bay	Exclusion - Keep oil out of the end of the bay	750'	Exclude end of bay w/ chevron formation	same as above	same as bove	same as bove

Table 4-13. ***References*** **- Strategy Field Visits/Tests**

	Date	Activity	Organization(s)	Point of Contact	Notes/Special conditions
1	3/97	Chevron drill	Clean Sound Cooperative	Roland Miller, Clean Sound (425) 783-0908; David Mora, Ecology (425) 649-7092	
2	10/96	Field visit/training	Ecology/Clean Sound Cooperative	David Mora, Ecology (425) 649-7092	
3	6/94	Field visit	Northwest Area Committee consortium of agencies/OSROs	Dale Davis/Dick Logan, Ecology. (360) 407-6972/ (360) 407-6971	Major field verification effort conducted during GRP development
4	9/96	Field test	Clean Sound, Chevron, Ecology	David Mora, Ecology (425) 649-7092	
5	6/97	Navy drill	Puget Sound Naval Shipyard, Ecology	Tammy Brown, Puget Sound Naval Shipyard (360) 476-1842	
6	8/96	Navy drill	Puget Sound Naval Shipyard, Ecology, WDFW	Tammy Brown, Puget Sound Naval Shipyard (360) 476-1842	
7	7/95	Field visit/training	Clean Sound, Ecology	Roland Miller, Clean Sound (425) 783-0908	
8	10/96	Field visit	Texaco, Clean Sound, Ecology	David Mora, Ecology (425) 649-7092	
9	9/95	Drill	Arco, Clean Sound, Ecology	David Mora, Ecology (425) 649-7092	
10	8/94	Field visit	Northwest Area Committee consortium of agencies/OSROs	Dale Davis/Dick Logan, Ecology. (360) 407-6972/ (360) 407-6971	Major field verification effort conducted during GRP development
11	8/94	Field visit	Northwest Area Committee consortium of agencies/OSROs	Dale Davis/Dick Logan, Ecology. (360) 407-6972/ (360) 407-6971	
12	5/95	Field visit	Ecology/Foss/Tacoma Parks District	Dale Davis/Dick Logan, Ecology. (360) 407-6972/ (360) 407-6971	
13	9/94	Field visit	Northwest Area Committee consortium of agencies/OSROs	Dale Davis/Dick Logan, Ecology. (360) 407-6972/ (360) 407-6971	
14	1995	Field test	Clean Sound/U.S. Oil	Roland Miller, Clean Sound (425) 783-0908	

5. Shoreline Information

5.1. Shoreline Types and Sensitivity

The type of shoreline, degree of exposure to waves and currents, and biological sensitivity are the main criteria for selecting appropriate treatment techniques. Each shoreline type has particular properties (including vegetation types) which facilitate or resist the penetration and persistence of oil. Areas of comparatively uniform sediment type and grain size experience a deeper penetration of oil. Grain size definitions are:

Mud	<0.0625 mm
Fine Sand	0.0625 - 2 mm
Medium to Coarse Sand	2 - 4 mm
Pebble/Cobble	4 - 256 mm

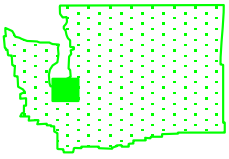
Persistence of oil in a particular area is directly related to the intensity of wave action, tides, and currents. Based on numerous oil spill studies of shoreline characteristics, treatment, and oil impact, the matrices in Chapter 5 were formulated following the basic prototype of the Environmental Sensitivity Index Atlas.

The environmental sensitivity index (ESI) system ranks coastal environments on a scale of 1-10 or 11 (less sensitive to more sensitive) with respect to oil spill sensitivity and potential biological injury. ESI is being used for mapping extensive areas of the coastline of the U.S. Generally speaking, areas exposed to high levels of physical energy, such as wave action and tidal currents, rank low on the scale while sheltered areas have the highest ranking. The shoreline types used in this manual are a combination of the two similar systems used for the Delaware/Pennsylvania/New Jersey ESI Atlas, and the Maryland and Virginia atlases. The numbering system for the Countermeasure Manual Shoreline Types does not correspond exactly to either atlas; however, the corresponding shoreline types can be identified easily from the ESI maps and reassigned the appropriate number (after field verification.) The shoreline ranking system provides a useful first step in the design of contingency plans because it identifies the priority areas that require maximum effort for protection and cleanup. Strike teams and contractors with this document can focus their activities on environmental priorities, particularly during the first few hours and days of the spill.[8]

[8]Regional Response Team III. Draft, *Shoreline Countermeasures Manual*. (Department of the Interior, March 22,1991).

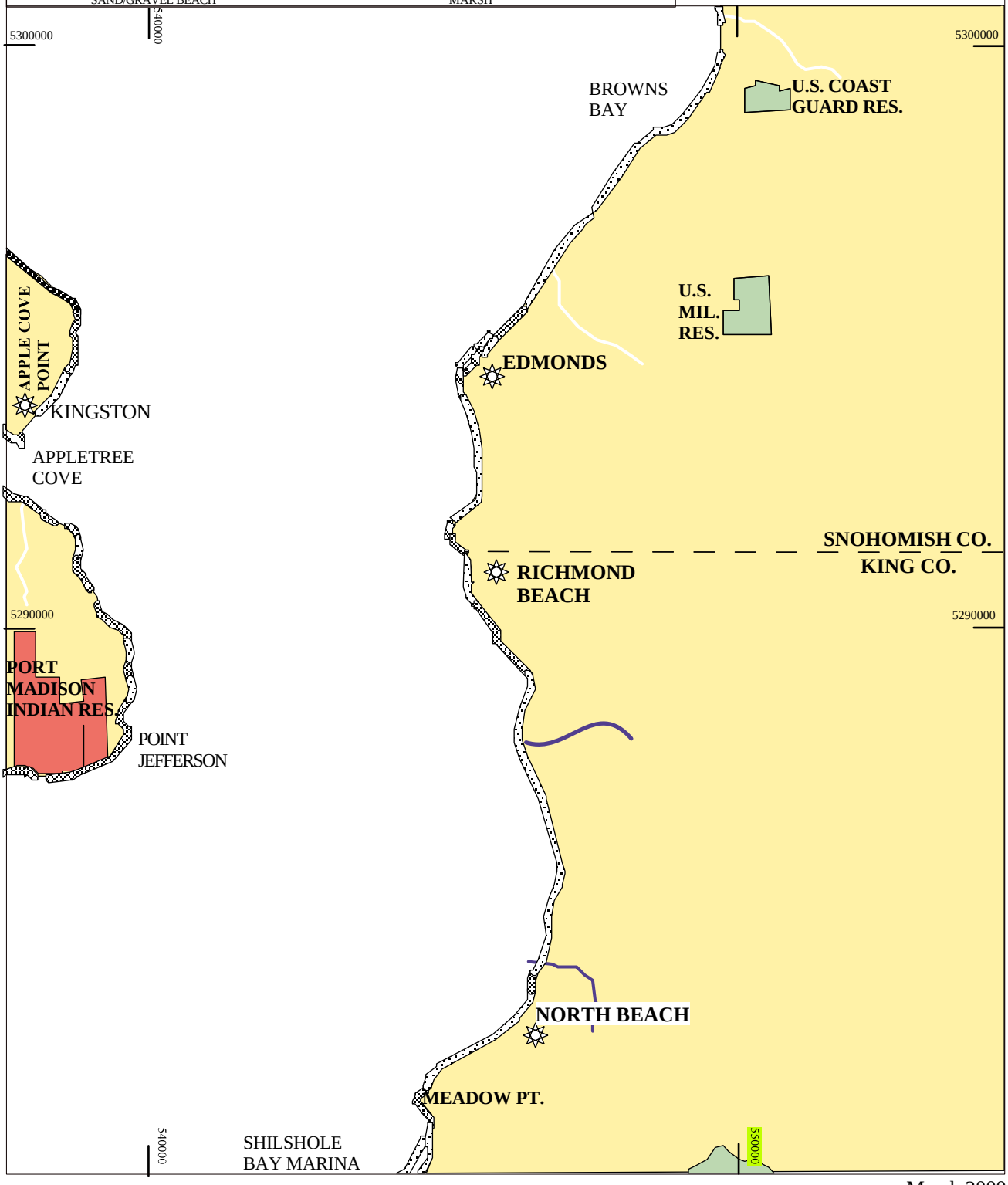
5.2. Shoreline Type Maps

EDMONDS SHORELINE TYPES



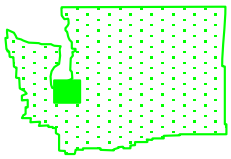
EXPOSED ROCKY SHORE (OR SEAWALL)
WAVE-CUT PLATFORM
FINE GRAINED BEACH
COARSE GRAINED BEACH
SAND/GRAVEL BEACH
GRAVEL/COBBLE/RIPRAP BEACH
EXPOSED TIDAL FLAT
SHELTERED ROCKY FLAT
SHELTERED TIDAL FLAT
MARSH

2500 meters 5000 meters
8200 feet 16400 feet
1 inch equals 2500 meters



PORT MADISON SHORELINE TYPES

CENTRAL PUGET SOUND GRP

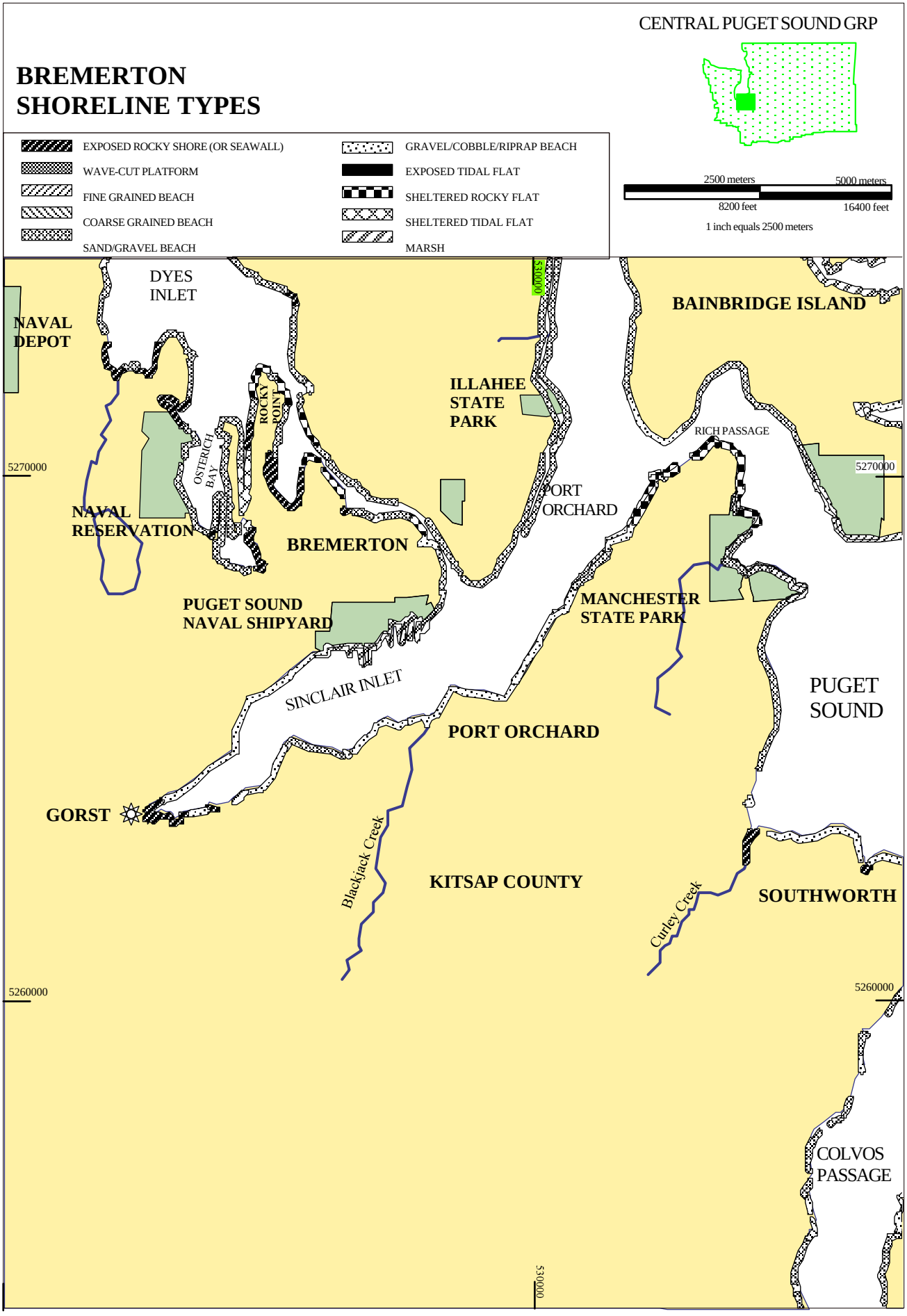


EXPOSED ROCKY SHORE (OR SEAWALL)
WAVE-CUT PLATFORM
FINE GRAINED BEACH
COARSE GRAINED BEACH
SAND/GRAVEL BEACH
GRAVEL/COBBLE/RIPRAP BEACH
EXPOSED TIDAL FLAT
SHELTERED ROCKY FLAT
SHELTERED TIDAL FLAT
MARSH

2500 meters 5000 meters
8200 feet 16400 feet
1 inch equals 2500 meters

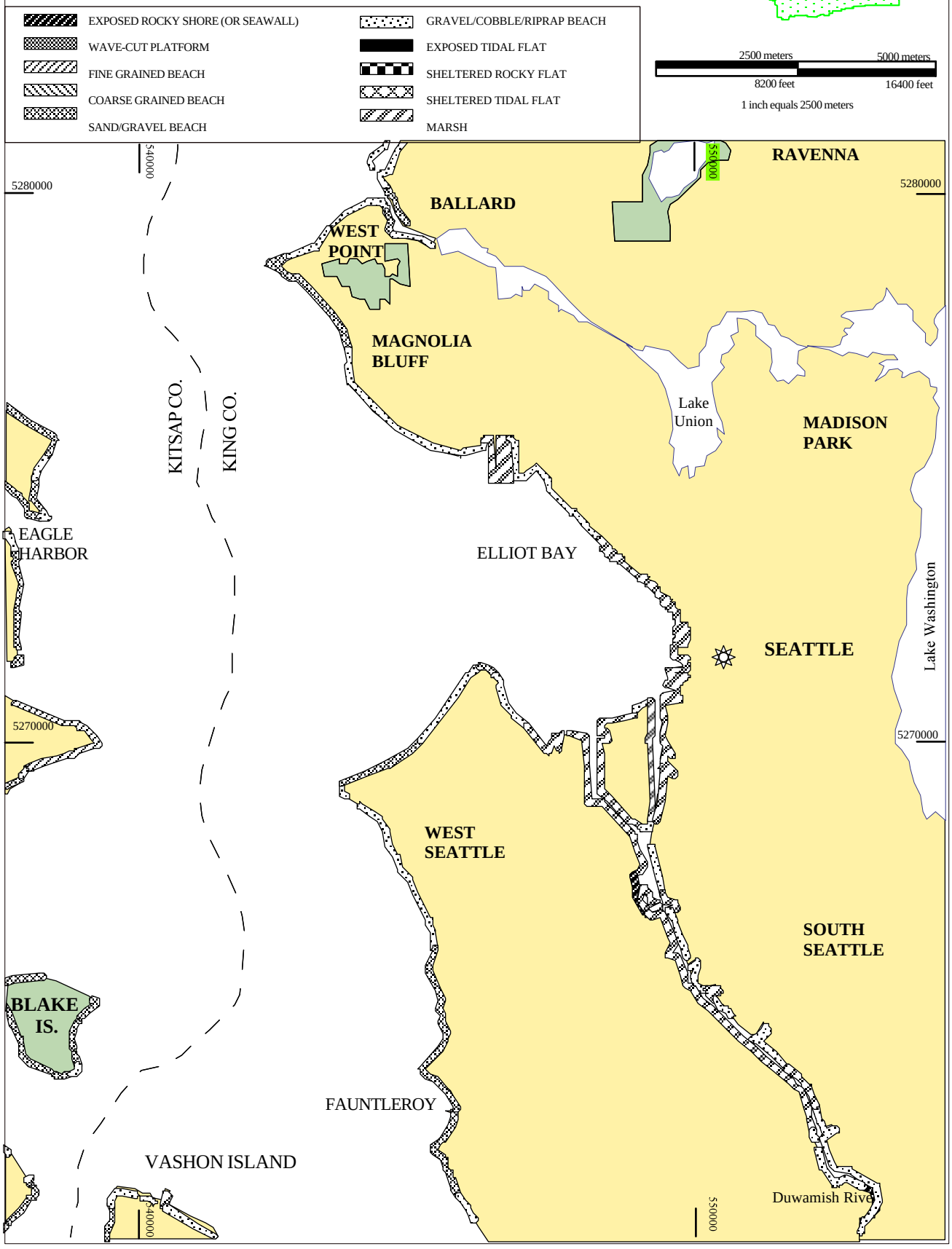
530000
KITSAP COUNTY
VINLAND
5290000
PORT MADISON INDIAN RESERVATION
5290000
INDIANOLA
PORT MADISON INDIAN RESERVATION
POULSBO
U.S. NAVAL RESERVATION.
PORT MADISON
LIBERTY BAY
AGATE PASS
POINT BOLIN
U.S. NAVAL RES.
PORT MADISON
5280000
5280000
Baker Creek
BARKER CREEK
PORT ORCHARD
ARROW POINT
BAINBRIDGE ISLAND
BROWNSVILLE
Crouch Creek
SILVERDALE
DYES INLET
WINSLOW
530000

BREMERTON SHORELINE TYPES



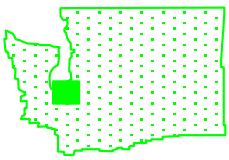
CENTRAL PUGET SOUND GRP

SEATTLE SHORELINE TYPES



CENTRAL PUGET SOUND GRP

EAST PASSAGE SHORELINE TYPES



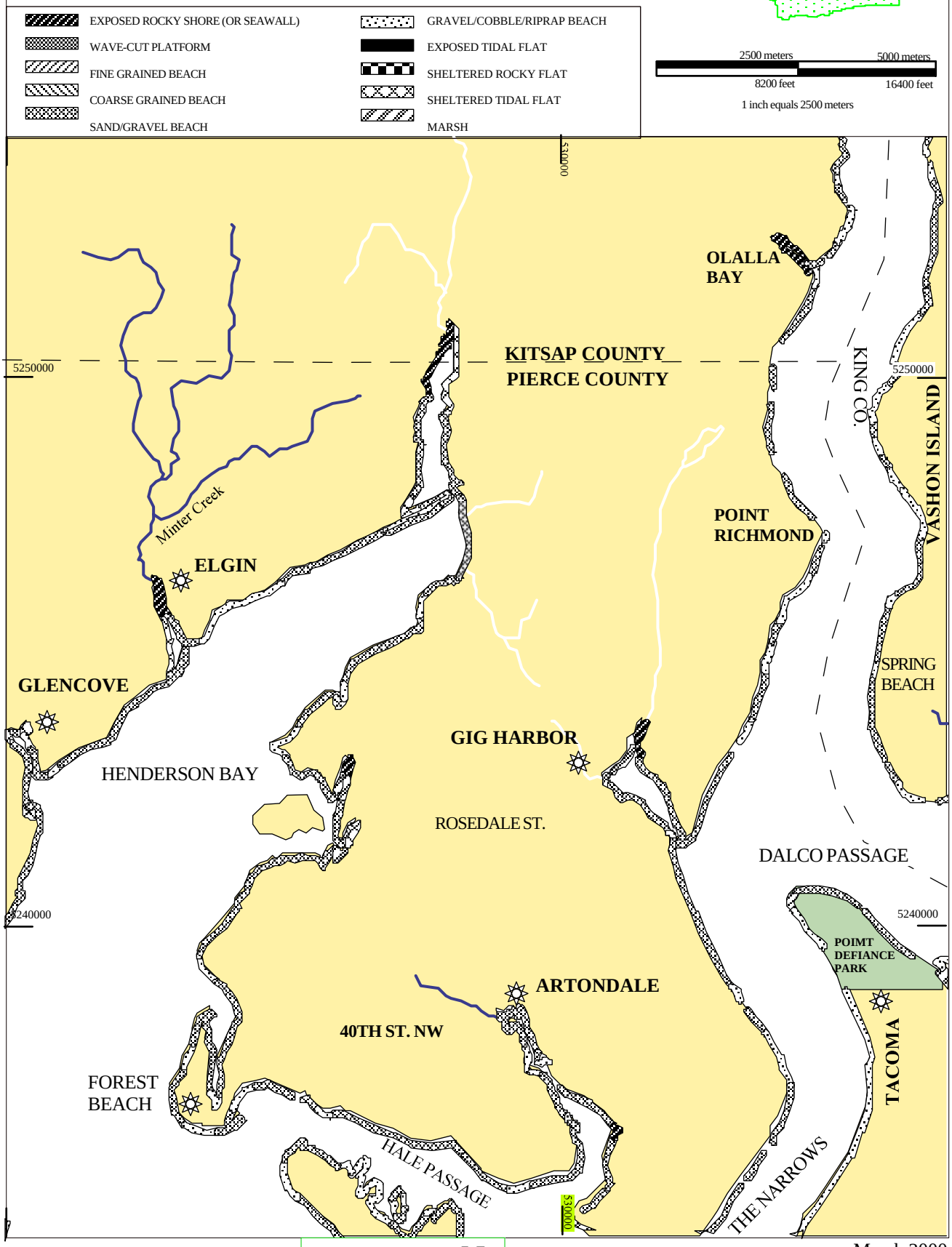
EXPOSED ROCKY SHORE (OR SEAWALL)
WAVE-CUT PLATFORM
FINE GRAINED BEACH
COARSE GRAINED BEACH
SAND/GRAVEL BEACH
GRAVEL/COBBLE/RIPRAP BEACH
EXPOSED TIDAL FLAT
SHELTERED ROCKY FLAT
SHELTERED TIDAL FLAT
MARSH

2500 meters 5000 meters
8200 feet 16400 feet
1 inch equals 2500 meters

KITSAP CO.
KING CO.
5250000
550000
BURIEN
TUKWILA
VASHON ISLAND
THREE TREE PT
PUGET SOUND
EAST PASSAGE
Judd Creek
TRAMP
HBR
Des Moines Marina
Sling Launch
5240000
MIDWAY
MAURY
ISLAND
QUARTER-
MASTER HBR
SALTWATER
STATE PARK
DOCKTON
POVERTY
BAY
REDONDO

CENTRAL PUGET SOUND GRP

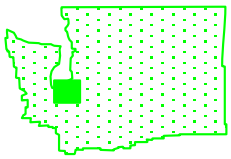
GIG HARBOR SHORELINE TYPES



March 2000

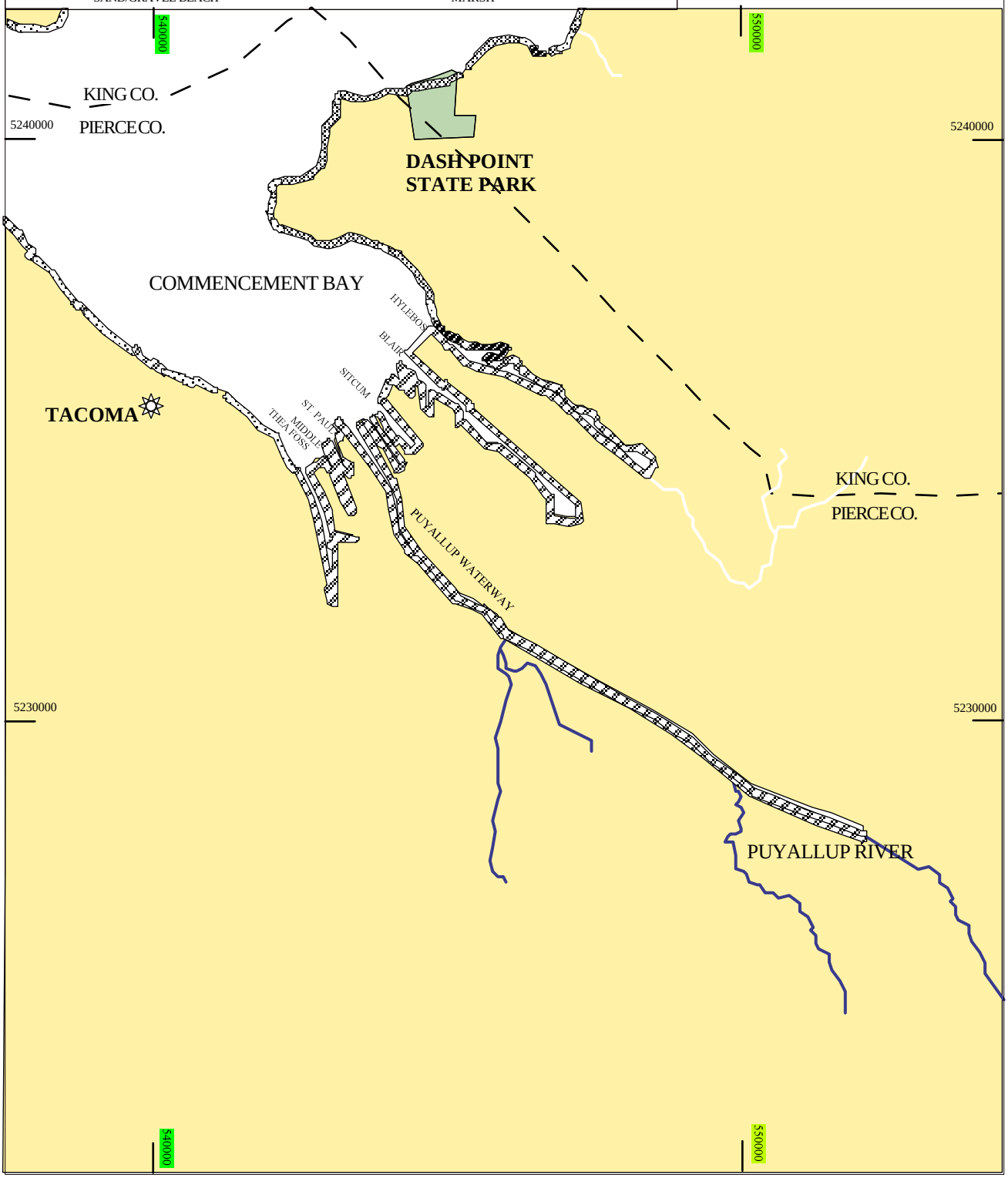
COMMENCEMENT BAY SHORELINE TYPES

CENTRAL PUGET SOUND GRP



EXPOSED ROCKY SHORE (OR SEAWALL)
WAVE-CUT PLATFORM
FINE GRAINED BEACH
COARSE GRAINED BEACH
SAND/GRAVEL BEACH
GRAVEL/COBBLE/RIPRAP BEACH
EXPOSED TIDAL FLAT
SHELTERED ROCKY FLAT
SHELTERED TIDAL FLAT
MARSH

2500 meters 5000 meters
8200 feet 16400 feet
1 inch equals 2500 meters



5.3 Shoreline Countermeasure Matrices

The matrices included here show which shoreline countermeasure techniques have been considered for the fourteen shoreline types described in Chapter 2 of the "Shoreline Countermeasures Manual & Matrices", Northwest Area Plan, Chapter 9650, Page 9-37. Four matrices have been constructed for the major categories of oil (heavy, medium, light, very light).

Countermeasure methods are described in Chapters 3 and 4 of the manual. Countermeasures in Chapter 3 are traditional or conventional techniques that the OSC can use without any additional concurrence. However, the cutting of vegetation countermeasure should be used only during specific seasonal windows under specific conditions and with landowner approval. Countermeasures in Chapter 4 are described under a separate section called "Shoreline Countermeasure Methods Using Alternative Technology" may be useful in certain situations. These methods are considered more experimental and controversial in their application and potential impacts and require more formal review and consultation before implementing. The exact requirements are spelled out in the National Contingency Plan and the Northwest Area Plan. The Shoreline Countermeasures Matrices are a particularly dynamic component of the manual and should continue to be revised as the existing techniques are used and evaluated, and as both old and new techniques are refined.

Each matrix has a written explanation of how it is to be used as a countermeasure advisability matrix. The matrices are only a general guide for removing oil from shoreline substrates. They must be used in conjunction with the entire "Shoreline Countermeasures Manual" plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the State OSC operating with the FOSC's authorization has the responsibility for and authority to determine which countermeasure(s) are appropriate for the various situations encountered.

Selection of countermeasure techniques to be used in each spill is based upon the degree of oil contamination, shoreline types, and the presence of sensitive resources. Extremely sensitive areas are generally limited to manual cleanup methods. It is important to note that the primary goal of countermeasure implementation is the removal of oil from the shoreline with no further injury or destruction to the environment. The three categories of guidance used in the matrices are defined as follows:

R	Recommended	May be the preferred method that best achieves the goal of minimizing destruction or injury to the environment
C	Conditional	Viable and possibly useful but may result in limited adverse effects to the environment
	Shaded	Not applicable or not generally recommended.

SHORELINE COUNTERMEASURES MATRIX

Heavy Oil (Heavy Crude Oils, Intermediate Fuel Oils, Bunker C & Heavily Weathered Medium Crudes)

- Heavy oils with little or no evaporation or dissolution
- Water-soluble fraction likely to be <10ppm
- Heavy contamination of intertidal areas likely
- Severe impacts to waterfowl and fur-bearing mammals (coating and ingestion)
- Long-term contamination to sediments possible
- Weathers very slowly
- Dispersion seldom effective
- Shoreline cleanup difficult under all conditions

SHORELINE TYPES CODES

1- Exposed rock shores and vertical, hard man-made structure (e.g. seawalls)
2 - Exposed wave-cut platforms
3 - Fine to medium grained sand beaches & steep unvegetated river banks
4 - Course grained sand beaches
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material
6A - Gravel beaches - pebbles to cobble
6B - Gravel beaches - cobbles to boulders
6C - Exposed rip rap
7 - Exposed tidal flat
8A- Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks, bulkheads)
8B - Sheltered rubble slope
9A - Sheltered sand and mud flats
9B - Sheltered vegetated low bank
10 - Marshes

COUNTERMEASURES	SHORELINE TYPES 1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
CONVENTIONAL METHODS														
No action	C	C	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil	C	R	R	R	R	C	C	C		R	R		C	C
Passive collection of oil	R	R	R	R	R	R	R	R	C	R	R	C	R	R
Oiled debris removal	C	R	R	R	R	R	R	R	C	R	R	C	R	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C		C					C	
Ambient water flooding (Deluge)			C	C	C	R	R	R		R	R		C	C
Amb water flush <50 psi	C	C			C	R	C	R		C	C		C	C
Amb water flush <100 psi	C	C					C	C		C	C			
Warm water flush <90°F	C						C	C		C				
Hot water flush >90°F	C									C				
Vacuum removal of oil	C	C	C	C	C	C	C	C		C	C		C	C
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement			C	C	C	C		C						
Cutting oiled vegetation							C	C		C	C		C	C
ALTERNATIVE METHODS*														
In-situ burning on shore														
Chemical stabilization, protection, cleaning														
Nutrient enhancement			C	C	C	C	C	C						C
Microbial addition														

R Recommend - May be Preferred Alternative
C Conditional (Refer to NW Shoreline Countermeasures Manual)
Shaded areas are Not Applicable or Not Generally Recommened
***** Follow approved process defined in NCP and NW Area Plan

This countermeasure advisability matrix is only a general guide for removal of oil from shoreline substrates. It must be used in conjunction with the entire Shoreline Countermeasures Manual plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the state OSC operating with the FOSC's authorization has the responsibility for and the authority to determine which countermeasure(s) are appropriate for various situations encountered. Selection of countermeasures is based on the degree of oil contamination, the shoreline type, and the presence of sensitive resources.

SHORELINE COUNTERMEASURES MATRIX

Medium Oil (Most Crude Oils & Some Heavily Weathered Light Crudes)

- About 1/3 will evaporate within 24 hours
- Maximum water-soluble fraction is 10-100ppm
- Oil contamination of intertidal areas can be severe and long-term
- Impact to waterfowl and fur-bearing mammals can be severe
- Chemical dispersion is an option within 1-2 days
- Cleanup most effective if conducted quickly

SHORELINE TYPES CODES

1- Exposed rock shores and vertical, hard man-made structure (e.g. seawalls)
2 - Exposed wave-cut platforms
3 - Fine to medium grained sand beaches & steep unvegetated river banks
4 - Course grained sand beaches
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material
6A - Gravel beaches - pebbles to cobble
6B - Gravel beaches - cobbles to boulders
6C - Exposed rip rap
7 - Exposed tidal flat
8A- Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks, bulkheads)
8B - Sheltered rubble slope
9A - Sheltered sand and mud flats
9B - Sheltered vegetated low bank
10 - Marshes

COUNTERMEASURES	SHORELINE TYPES 1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
CONVENTIONAL METHODS														
No action	C	C	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil	C	R	R	R	R	C	C	C		R	R		C	C
Passive collection of oil	R	R	R	R	R	R	R	R	C	R	R	R	R	R
Oiled debris removal	C	R	R	R	R	R	R	R	C	R	R	C	R	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C							C	
Ambient water flooding (Deluge)			C	C	C	R	R	R		R	R		C	C
Amb water flush <50 psi	C	C			C	R	C	R		R	R		C	C
Amb water flush <100 psi	C	C					C	C		C				
Warm water flush <90°F	C						C	C		C				
Hot water flush >90°F	C									C				
Vacuum removal of oil	C	C	R	R		C	R	R		C	C		C	C
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement			C	C	C	C		C			C			
Cutting oiled vegetation							C	C		C	C		C	C
ALTERNATIVE METHODS*														
In-situ burning on shore														
Chemical stabilization, protection, cleaning														
Nutrient enhancement			C	C	C	C	C	C			C			C
Microbial addition														

R Recommend - May be Preferred Alternative
C Conditional (Refer to NW Shoreline Countermeasures Manual)
Shaded areas are Not Applicable or Not Generally Recommened
***** Follow approved process defined in NCP and NW Area Plan

This countermeasure advisability matrix is only a general guide for removal of oil from shoreline substrates. It must be used in conjunction with the entire Shoreline Countermeasures Manual plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the state OSC operating with the FOSC's authorization has the responsibility for and the authority to determine which countermeasure(s) are appropriate for various situations encountered. Selection of countermeasures is based on the degree of oil contamination, the shoreline type, and the presence of sensitive resources.

SHORELINE COUNTERMEASURES MATRIX

Light Oil (Diesel, No 2 Fuel Oils, Light Crudes)

- Moderately volatile; will leave residue (up to 1/3 of spilled amount)
- Moderate concentrations of toxic (soluble) compounds
- Long-term contamination of intertidal resources possible
- Potential for subtidal impacts (dissolution, mixing, sorption onto suspended sediments)
- No dispersion necessary
- Cleanup can be very effective

SHORELINE TYPES CODES

1- Exposed rock shores and vertical, hard man-made structure (e.g. seawalls)
2 - Exposed wave-cut platforms
3 - Fine to medium grained sand beaches & steep unvegetated river banks
4 - Course grained sand beaches
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material
6A - Gravel beaches - pebbles to cobble
6B - Gravel beaches - cobbles to boulders
6C - Exposed rip rap
7 - Exposed tidal flat
8A- Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks, bulkheads)
8B - Sheltered rubble slope
9A - Sheltered sand and mud flats
9B - Sheltered vegetated low bank
10 - Marshes

COUNTERMEASURES	SHORELINE TYPES 1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
CONVENTIONAL METHODS														
No action	R	R	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil			C	C	C	C	C	C		R	R		C	
Passive collection of oil	C	R	R	R	R	R	R	R	C	R	R	C	R	R
Oiled debris removal	C	C	R	R	R	R	R	R	C	R	R	C	C	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C								
Ambient water flooding (Deluge)			C	C	C	R	R	R			C			C
Amb water flush <50 psi		C			C	C	C	C		R	C			C
Amb water flush <100 psi														
Warm water flush <90°F														
Hot water flush >90°F														
Vacuum removal of oil							C	C						C
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement			C	C	C									
Cutting oiled vegetation							C	C		C	C		C	C
ALTERNATIVE METHODS*														
In-situ burning of shore														
Chemical stabilization, protection, cleaning														
Nutrient enhancement			C	C	C	C	C	C						C
Microbial addition														

R Recommend - May be Preferred Alternative
C Conditional (Refer to NW Shoreline Countermeasures Manual)
Shaded areas are Not Applicable or Not Generally Recommened
***** Follow approved process defined in NCP and NW Area Plan

This countermeasure advisability matrix is only a general guide for removal of oil from shoreline substrates. It must be used in conjunction with the entire Shoreline Countermeasures Manual plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the state OSC operating with the FOSC's authorization has the responsibility for and the authority to determine which countermeasure(s) are appropriate for various situations encountered. Selection of countermeasures is based on the degree of oil contamination, the shoreline type, and the presence of sensitive resources.

SHORELINE COUNTERMEASURES MATRIX

Very Light Oil (Jet fuels, Gasoline)

- Highly volatile (should all evaporate within 1-2 days)
- High concentration of toxic (soluble) compounds
- Result: Localized, severe impacts to water column and intertidal resources
- Duration of impact is a function of the resource recovery rate
- No dispersion necessary

SHORELINE TYPES CODES

1- Exposed rock shores and vertical, hard man-made structure (e.g. seawalls)
2 - Exposed wave-cut platforms
3 - Fine to medium grained sand beaches & steep unvegetated river banks
4 - Course grained sand beaches
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material
6A - Gravel beaches - pebbles to cobble
6B - Gravel beaches - cobbles to boulders
6C - Exposed rip rap
7 - Exposed tidal flat
8A- Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks,
8B - Sheltered rubble slope
9A - Sheltered sand and mud flats
9B - Sheltered vegetated low bank
10 - Marshes

COUNTERMEASURES	SHORELINE TYPES 1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
CONVENTIONAL METHODS														
No action	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Manual removal of oil														
Passive collection of oil			C	C	C	C	C	C						
Oiled debris removal	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal														
Ambient water flooding (Deluge)														C
Amb water flush <50 psi														
Amb water flush <100 psi														
Warm water flush <90°F														
Hot water flush >90°F														
Vacuum removal of oil														
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement														
Cutting oiled vegetation														
ALTERNATIVE METHODS*														
In-situ burning on shore														
Chemical stabilization, protection, cleaning														
Nutrient enhancement														
Microbial addition														

R Recommend - May be Preferred Alternative
C Conditional (Refer to NW Shoreline Countermeasures Manual)
Shaded areas are Not Applicable or Not Generally Recommened
***** Follow approved process defined in NCP and NW Area Plan

This countermeasure advisability matrix is only a general guide for removal of oil from shoreline substrates. It must be used in conjunction with the entire Shoreline Countermeasures Manual plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the state OSC operating with the FOSC's authorization has the responsibility for and the authority to determine which countermeasure(s) are appropriate for various situations encountered. Selection of countermeasures is based on the degree of oil contamination, the shoreline type, and the presence of sensitive resources.

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6. Sensitive Resource Description*

6.1. Marine Mammals

While marine mammals can be expected anywhere in the Central Puget Sound, their numbers are lower here than in any other GRP area. Although harbor seals can be found throughout, there are very few regular haulout locations. California and Steller (Northern) sea lions may be found within this region from late fall through mid-spring, especially in the vicinity of river mouths or on navigation buoys. Although relatively few Steller sea lions are found in this area, this species is of special concern because it is listed as a Threatened species. Other marine mammals occasionally found in Central Puget Sound include Dall's porpoise, harbor porpoise, orcas (killer whales), and gray whales. Only the harbor seal and harbor porpoise are considered year around residents.

6.2. Birds

Although many species of birds nest and rear their young throughout the summer in this GRP area, the numbers and diversity of species increases dramatically during the migration and winter seasons. Breeding birds include great blue heron, osprey, bald eagle, glaucous-winged gull, pigeon guillemot and marbled murrelet. Species that pass through on spring and fall migration or winter here in large numbers include common, Pacific, and red-throated loons, horned red-necked and western grebes, double-crested, pelagic and Brandt's cormorants, Canada geese, brant, more than twenty species of ducks, over twenty species of shorebirds, Bonaparte's, mew, ring-billed, herring and Thayer's gulls, common murres and rhinoceros auklets.

Birds can be found in all parts of this GRP area but certain locations can be counted on to support large bird concentrations during the appropriate time of year. Shallow intertidal bays such as Quartermaster Harbor, Sinclair Inlet, and Miller Bay host large numbers of waterfowl, shorebirds and herons.

Areas where tides converge to create tide rips tend to concentrate baitfish such as herring and sandlance. Fish eating birds including loons, grebes, cormorants, gulls and alcids also congregate at these locations. Some of the major seabird concentration areas include Colvos Passage and the waters off of Point Defiance.

The three Endangered or Threatened species that breed in this GRP area are bald eagle, peregrine falcon and marbled murrelet.

6.3. Flight Restriction Zones

Flight restriction zones have been designated in the GRP to minimize disturbance to certain wildlife species. An identified location could represent a marine mammal haulout site, a seabird or heron colony, or the individual nest of a sensitive species such as bald eagle. While some zones may be restricted year around, others will be in effect only during the months listed in the matrix.

The no-fly bubble is the area within a 1,500 foot radius and below 1,000 feet in altitude around the location.

All aircraft, including those from the government, contractors or media, are expected to avoid these zones when restrictions are in effect. In the event that one of these zones must be entered during a spill response, clearance must be obtained from the Washington Department of Fish and Wildlife (WDF&W) and the United States Fish and Wildlife Service (USFWS), or when marine mammals other than sea otters are concerned, the National Marine Fisheries Service (NMFS). Sea otters are managed by the United States Fish and Wildlife Service.

* Generated for the GRP by the Spill Response and Resource Protection Team of the Washington Department of Fish and Wildlife

During oil spills, pilots are also asked to avoid disturbing any large concentrations of birds and other wildlife. By keeping a safe distance or altitude, pilots can prevent the accidental hazing of unaffected wildlife into oiled areas and minimize the risk of aircraft/ bird collisions.

6.4. Hazing

Hazing or directed harassment, is a method used to drive or herd wildlife out of an area where they are at risk of becoming oiled. Hazing techniques include the use of visual and audio devices, personnel for herding, vessels and aircraft. In the right circumstances it can be an effective tool for protecting some wildlife species. In other cases it can be disastrous as unaffected wildlife can be driven into oiled areas, or forced to abandon nests or young.

National Marine Fisheries Service staff or their designees will perform all hazing of marine mammals other than sea otters. Before hazing can begin for all other species of wildlife, clearance must be obtained from the Washington Department of Fisheries and Wildlife and the United States Fish and Wildlife Service. All hazing efforts during a spill will be directed by these agencies. The deliberate harassment of wildlife without first securing permission from these agencies is a violation of Federal and State laws.

The following information must be provided for a determination on whether hazing might be authorized in a given situation.

1. Description of the situation where hazing authorization is being sought
2. Location to be hazed
3. Species of wildlife to be hazed and number of animals
4. Methods and equipment used
5. Date and time of hazing
6. Name, phone number, radio frequency, pager number and the amount of hazing experience of the individual requesting permission

The responsible agencies will evaluate each request on a case by case basis. All hazing of marine mammals, threatened and endangered species, and all hazing by aircraft will be performed only under authority and general supervision of WDF&W, USFWS, NMFS or persons designated by these agencies. Representatives of these agencies can be contacted through the planning section of the Unified Command System during the spill event.

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EDMONDS FLIGHT RESTRICTION ZONES / SENSITIVE WILDLIFE

NOAA Chart 18474

Code	Location	Seabird Colony	Seabird Conc.	Waterfowl Conc.	Marine Mammal Haulout	Sensitive Nesting Species	Shorebird Conc.	Flight Exclusion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
WC-2	Apple Cove Point					**Yes**		**Yes**												
WC-3	Deer Creek					**Yes**		**Yes**												
WC-4	South Appletree Cove					**Yes**		**Yes**												
WC-5	President Point					**Yes**		**Yes**												
WC-6	Point Jefferson					**Yes**		**Yes**												
WC-12	Shilshole Bay					**Yes**		**Yes**												

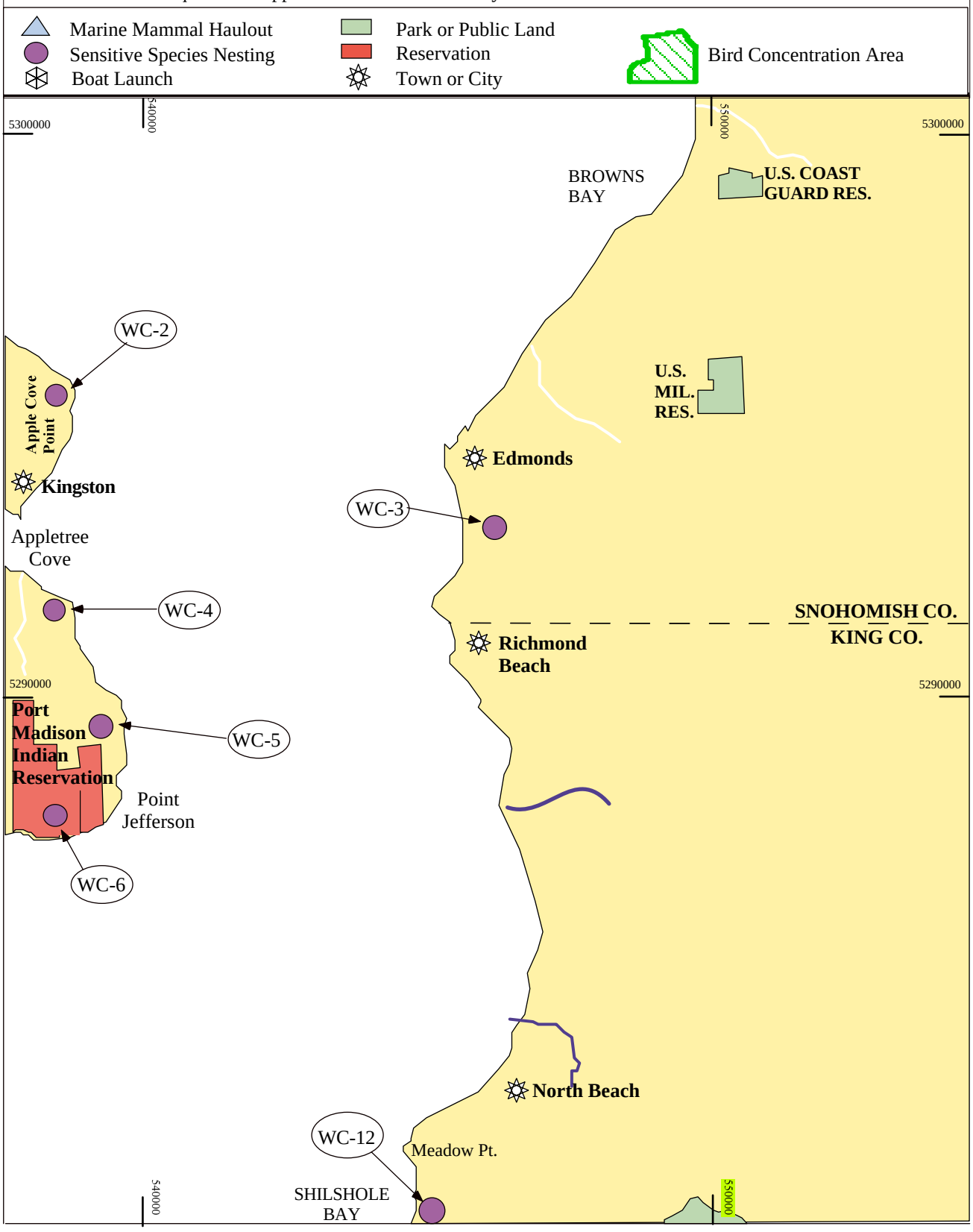
* FLIGHT AND GROUND ENTRY RESTRICTIONS

Flights below 1000 feet require clearance: See appendix on Flight Restriction Zones

Sensitive season - Minimize overflight disturbance

EDMONDS
FLIGHT RESTRICTION ZONES FOR SENSITIVE WILDLIFE SPECIES

1. Pilots refer to the chapter on Flight Restriction Zones.
2. All ground entry within 100 yards of sensitive nesting species is restricted.
3. All boaters are requested to approach no closer than 100 yards to seal and waterfowl concentrations.



PORT MADISON FLIGHT RESTRICTION ZONES / SENSITIVE WILDLIFE

1/2 Includes half of the month

NOAA Chart 18474

Code	Location	Seabird Colony	Seabird Conc.	Waterfowl Conc.	Marine Mammal Haulout	Sensitive Nesting Species	Shorebird Conc.	Flight Exclusion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
WC-7	Miller Bay			**Yes**		**Yes**		No												
WC-8	Keyport Dock	**Yes**						No												
WC-9	Keyport					**Yes**		**Yes**												
WC-10	Port Madison					**Yes**		**Yes**												
WC-16	Dyes Inlet/ Clear Creek			**Yes**				**Yes**					**1/2**			**1/2**				

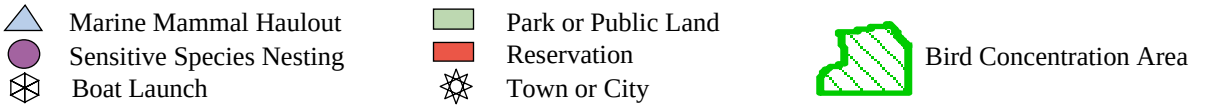
* FLIGHT AND GROUND ENTRY RESTRICTIONS

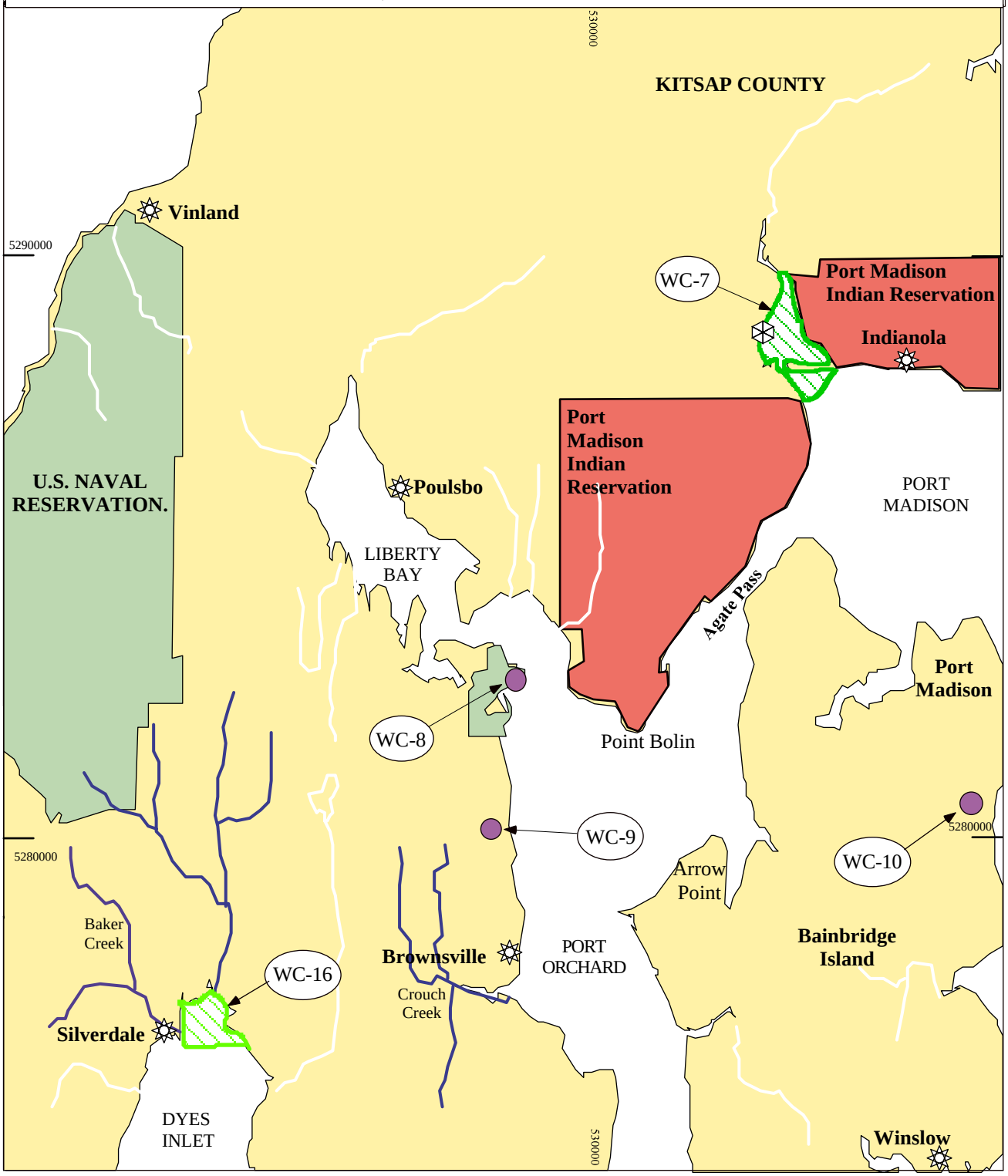
Flights below 1000 feet require clearance: See appendix on Flight Restriction Zones

Sensitive season - Minimize overflight disturbance

PORT MADISON
FLIGHT RESTRICTION ZONES FOR SENSITIVE WILDLIFE SPECIES

1. Pilots refer to the chapter on Flight Restriction Zones.
2. All ground entry within 100 yards of sensitive nesting species is restricted.
3. All boaters are requested to approach no closer than 100 yards to seal and waterfowl concentrations.





1/2	Includes half of the month

BREMERTON FLIGHT RESTRICTION ZONES / SENSITIVE WILDLIFE

NOAA Chart 18474

Code	Location	Seabird Colony	Seabird Conc.	Waterfowl Conc.	Marine Mammal Haulout	Sensitive Nesting Species	Shorebird Conc.	Flight Exclusion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
WC-17	Ostrich Bay					**Yes**		**Yes**												
WC-18	Rocky Point			**Yes**				**Yes**					**1/2**			**1/2**				
WC-19	Sulpher Springs			**Yes**				**Yes**					**1/2**			**1/2**				
WC-20	South Port Washington Narrows			**Yes**				**Yes**												
WC-21	Gorst		**Yes**	**Yes**			**Yes**	**Yes**												
WC-22	East Port Orchard			**Yes**				**Yes**					**1/2**			**1/2**				
WC-23	Orchard Point			**Yes**				**Yes**					**1/2**							
WC-28	Sinclair Inlet					**Yes**		**Yes**												
WC-30	View Park					**Yes**		**Yes**												
WC-33	Command Point					**Yes**		**Yes**												
WC-35	Colvos Passage		**Yes**					No												
WC-45	Illahee					**Yes**		**Yes**												
WC-46	South tip of Bainbridge Island			**Yes**				No												

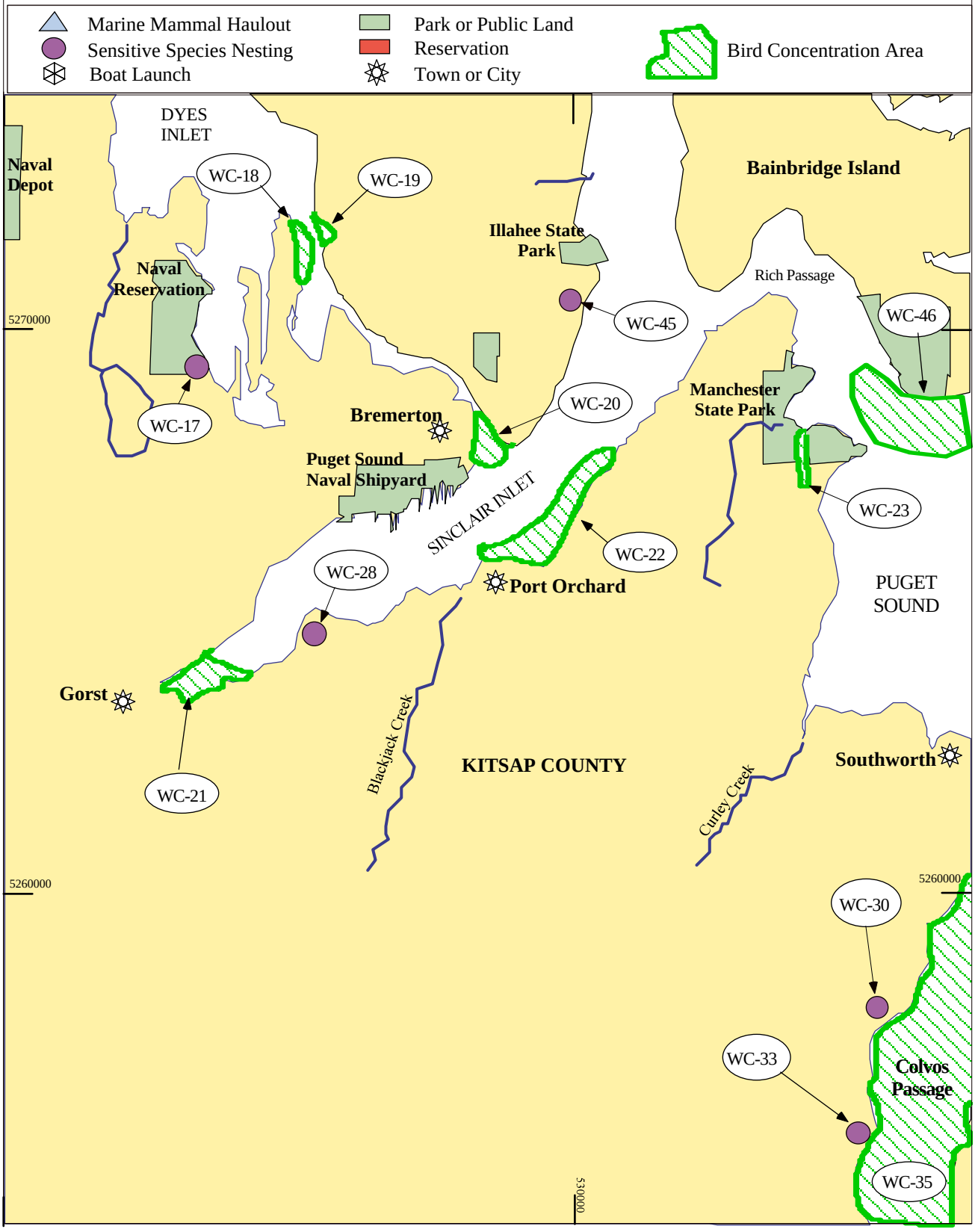
* FLIGHT AND GROUND ENTRY RESTRICTIONS

Flights below 1000 feet require clearance: See appendix on Flight Restriction Zones

Sensitive season - Minimize overflight disturbance

BREMERTON
FLIGHT RESTRICTION ZONES FOR SENSITIVE WILDLIFE SPECIES

1. Pilots refer to the chapter on Flight Restriction Zones.
2. All ground entry within 100 yards of sensitive nesting species is restricted.
3. All boaters are requested to approach no closer than 100 yards to seal and waterfowl concentrations.



1/2	Includes half of the month

SEATTLE FLIGHT RESTRICTION ZONES / SENSITIVE WILDLIFE

NOAA Chart 18474

Code	Location	Seabird Colony	Seabird Conc.	Waterfowl Conc.	Marine Mammal Haulout	Sensitive Nesting Species	Shorebird Conc.	Flight Exclusion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
WC-13	Shilshole Bay				**Yes**			**Yes**												
WC-14	Yeomalt Point					**Yes**		**Yes**												
WC-24	Restoration Point					**Yes**		**Yes**												
WC-29	Blake Island					**Yes**		**Yes**												
WC-35	Colvos Passage		**Yes**					No												
WC-46	South tip of Bainbridge Island			**Yes**				No					**1/2**							
WC-47	Alki Point south to Point Williams			**Yes**				No												

* FLIGHT AND GROUND ENTRY RESTRICTIONS

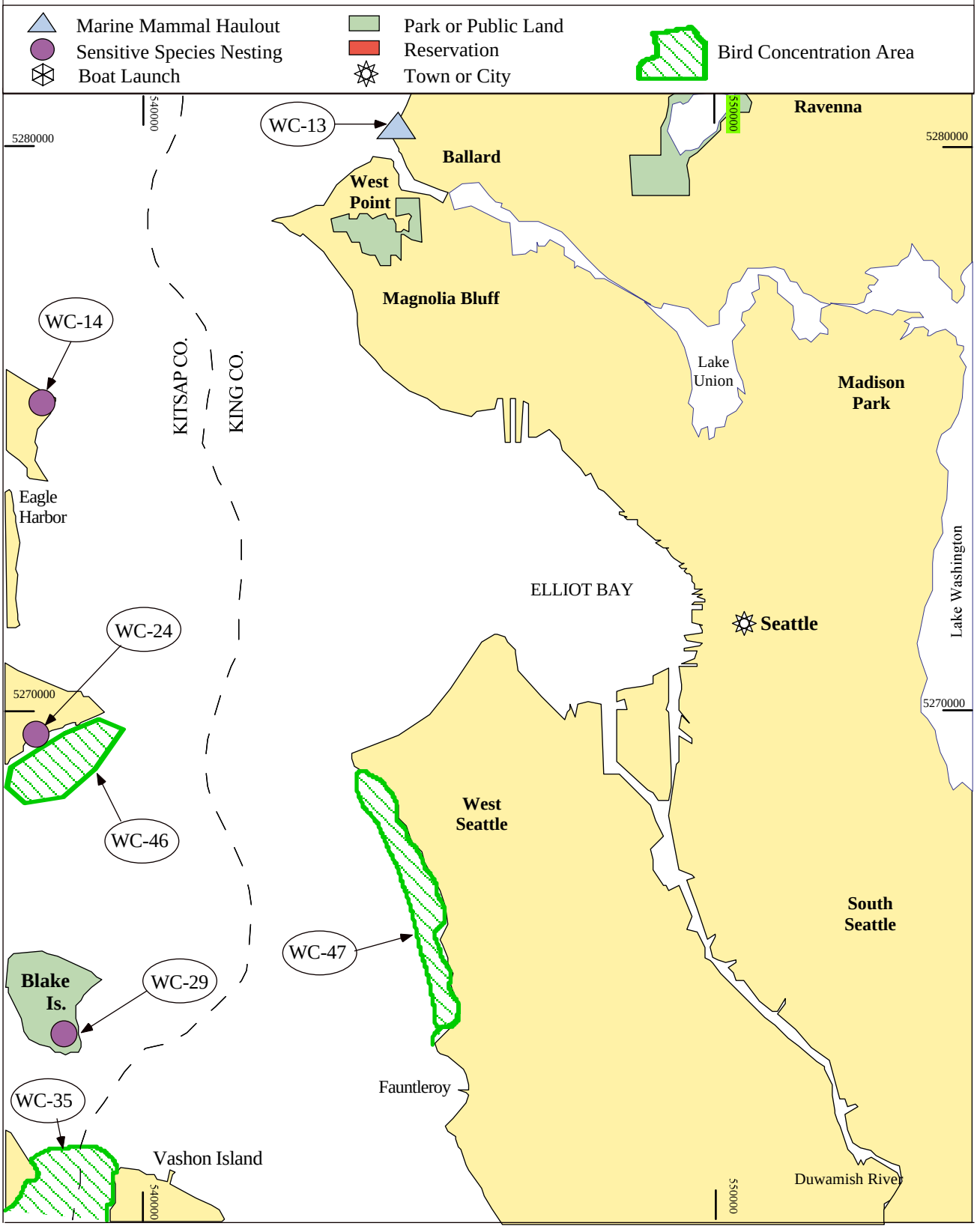
Flights below 1000 feet require clearance: See appendix on Flight Restriction Zones

Sensitive season - Minimize overflight disturbance

CENTRAL PUGET SOUND GRP

SEATTLE
FLIGHT RESTRICTION ZONES FOR SENSITIVE WILDLIFE SPECIES

1. Pilots refer to the chapter on Flight Restriction Zones.
2. All ground entry within 100 yards of sensitive nesting species is restricted.
3. All boaters are requested to approach no closer than 100 yards to seal and waterfowl concentrations.



1/2 Includes half of the month

EAST PASSAGE FLIGHT RESTRICTION ZONES / SENSITIVE WILDLIFE

NOAA Chart 18474

Code	Location	Seabird Colony	Seabird Conc.	Waterfowl Conc.	Marine Mammal Haulout	Sensitive Nesting Species	Shorebird Conc.	Flight Exclusion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
WC-31	Sylvan Beach					**Yes**		**Yes**												
WC-32	Seahurst					**Yes**		**Yes**		**1/2**										
WC-34	Point Beals					**Yes**		**Yes**												
WC-35	Colvos Passage		**Yes**					No												
WC-36	Quartermaster Harbor					**Yes**		**Yes**		**1/2**										
WC-38	Neill Point					**Yes**		**Yes**												
WC-40	Redondo					**Yes**		**Yes**												
WC-42	Dumas Bay					**Yes**		**Yes**												
WC-48	Quartermaster Harbor		**Yes**	**Yes**				No					**1/2**							

* FLIGHT AND GROUND ENTRY RESTRICTIONS

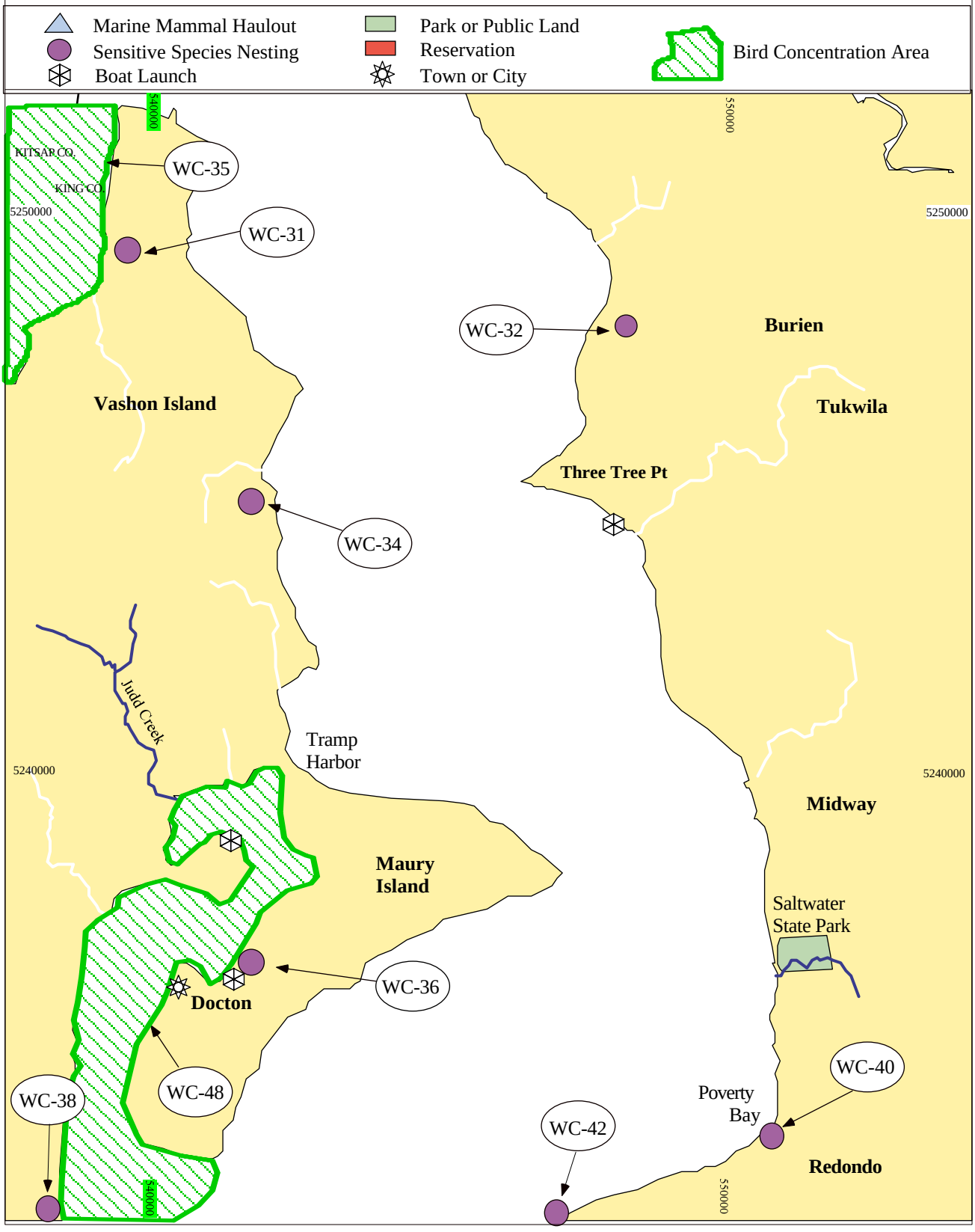
Flights below 1000 feet require clearance: See appendix on Flight Restriction Zones

Sensitive season - Minimize overflight disturbance

CENTRAL PUGET SOUND GRP

EAST PASSAGE
FLIGHT RESTRICTION ZONES FOR SENSITIVE WILDLIFE P

1. Pilots refer to the chapter on Flight Restriction Zones.
2. All ground entry within 100 yards of sensitive nesting species is restricted.
3. All boaters are requested to approach no closer than 100 yards to seal and waterfowl concentrations.



1/2	Includes half of the month

GIG HARBOR FLIGHT RESTRICTION ZONES / SENSITIVE WILDLIFE

NOAA Chart 18474

Code	Location	Seabird Colony	Seabird Conc.	Waterfowl Conc.	Marine Mammal Haulout	Sensitive Nesting Species	Shorebird Conc.	Flight Exclusion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
WSP-1	Tacoma Narrows		**Yes**	**Yes**				No				**1/2**								
WSP-2	Carr Inlet		**Yes**	**Yes**				No										**1/2**		
WSP-3	Burley Lagoon			**Yes**				No												
WSP-4	Rosedale Beach				**Yes**			**Yes**												
WSP-5	Cutts Island				**Yes**			**Yes**												
WSP-25	Horsehead Bay				**Yes**			**Yes**												
WC-35	Colvos Passage		**Yes**					No												
WC-37	Point Dalco					**Yes**		**Yes**												
WC-41	Point Defiance					**Yes**		**Yes**												

* FLIGHT AND GROUND ENTRY RESTRICTIONS

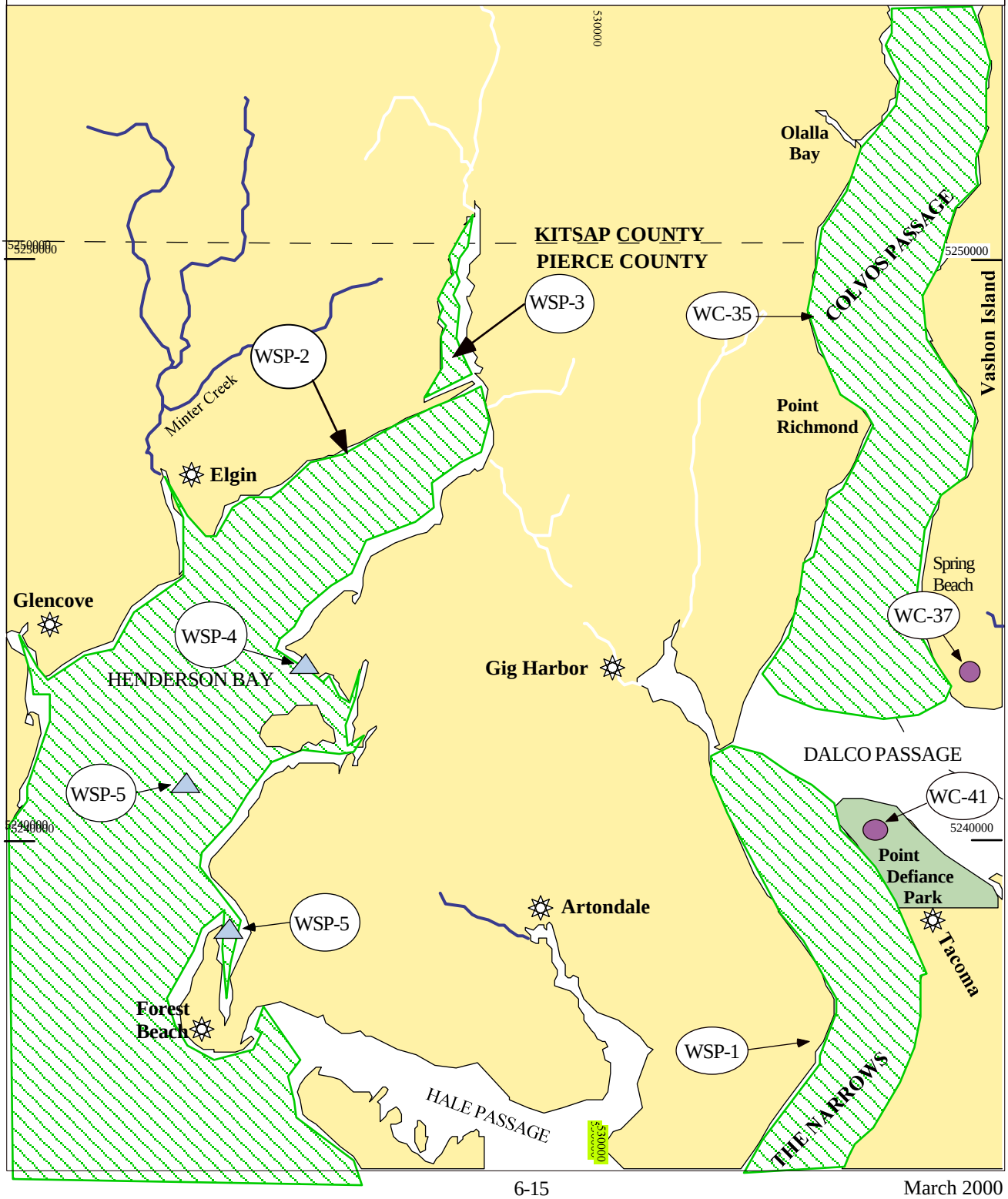
Flights below 1000 feet require clearance: See appendix on Flight Restriction Zones

Sensitive season - Minimize overflight disturbance

CENTRAL PUGET SOUND GRP

GIG HARBOR
FLIGHT RESTRICTION ZONES FOR SENSITIVE WILDLIFE SPECIES

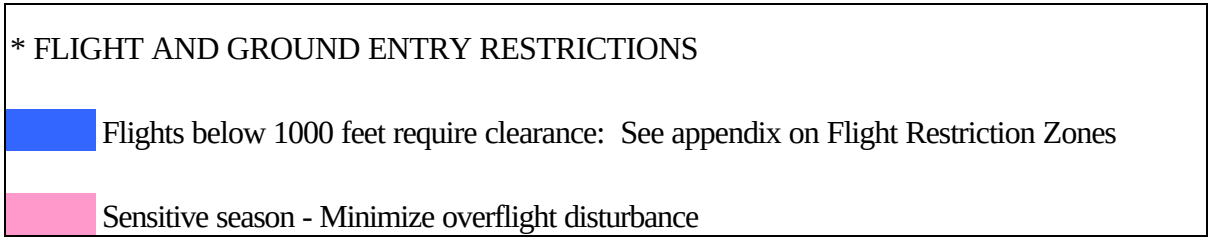
1. Pilots refer to the chapter on Flight Restriction Zones.
2. All ground entry within 100 yards of sensitive nesting species is restricted.
3. All boaters are requested to approach no closer than 100 yards to seal and waterfowl concentrations.



COMMENCEMENT BAY FLIGHT RESTRICTION ZONES / SENSITIVE WILDLIFE

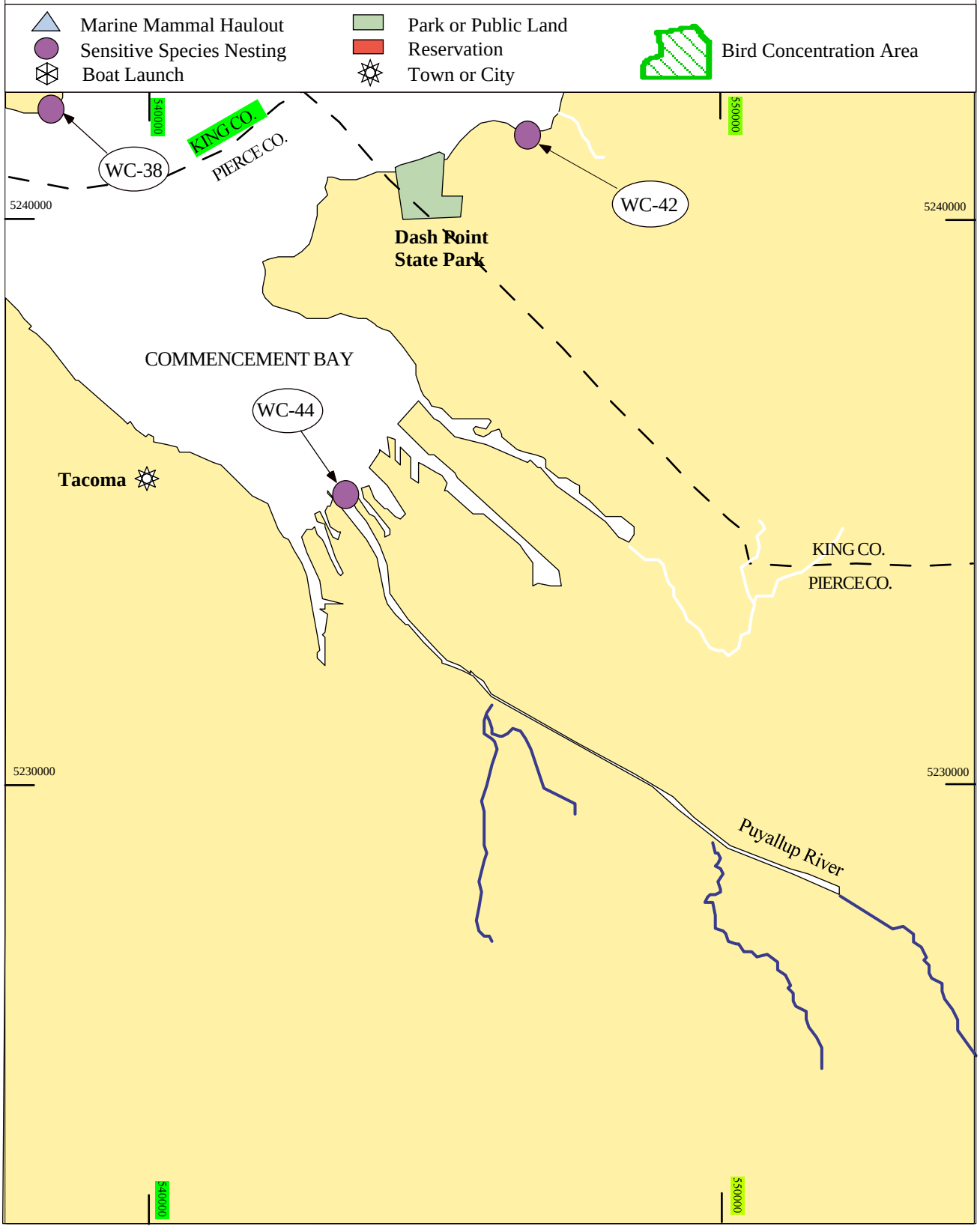
NOAA Chart 18474

Code	Location	Seabird Colony	Seabird Conc.	Waterfowl Conc.	Marine Mammal Haulout	Sensitive Nesting Species	Shorebird Conc.	Flight Exclusion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
WC-38	Neill Point					**Yes**		**Yes**												
WC-42	Dumas Bay					**Yes**		**Yes**												
WC-44	Commencement Bay			**Yes**				**Yes**												



COMMENCEMENT BAY
FLIGHT RESTRICTION ZONES FOR SENSITIVE WILDLIFE SPECIES

1. Pilots refer to the chapter on Flight Restriction Zones.
2. All ground entry within 100 yards of sensitive nesting species is restricted.
3. All boaters are requested to approach no closer than 100 yards to seal and waterfowl concentrations.



FLIGHT RESTRICTION ZONES / SENSITIVE WILDLIFE SUMMARY

Code	Location	Seabird Colony	Seabird Conc.	Waterfowl Conc.	Marine Mammal Haulout	Sensitive Nesting Species	Shorebird Conc.	Flight Exclusion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
WC-2	Apple Cove Point					Yes		Yes		■	■	■	■	■	■					
WC-3	Deer Cove					Yes		Yes		■	■	■	■	■	■					
WC-4	South Appletree Cove					Yes		Yes		■	■	■	■	■	■					
WC-5	President Point					Yes		Yes		■	■	■	■	■	■					
WC-6	Point Jefferson					Yes		Yes		■	■	■	■	■	■					
WC-7	Miller Bay			Yes				No	■	■	■	■	■	■	■	■	■	■	■	■
WC-8	Keyport Dock	Yes						No				■	■	■	■	■	■			
WC-9	Keyport					Yes		Yes		■	■	■	■	■	■					
WC-10	Port Madison					Yes		Yes		■	■	■	■	■	■					
WC-12	Shilshole Bay					Yes		Yes		■	■	■	■	■	■					
WC-13	Shilshole Bay				Yes			Yes	■	■	■	■	■	■			■	■	■	■
WC-14	Yeomalt Point					Yes		Yes		■	■	■	■	■	■	■	■			
WC-16	Dyes Inlet / Clear Creek			Yes				Yes	■	■	■	■	■			■	■	■	■	■
WC-17	Ostrich Bay					Yes		Yes		■	■	■	■	■	■					
WC-18	Rocky Point			Yes				Yes	■	■	■	■	■			■	■	■	■	■
WC-19	Sulphur Springs			Yes				Yes	■	■	■	■	■			■	■	■	■	■
WC-20	South Port Washington Narrows			Yes				Yes	■	■	■	■	■			■	■	■	■	■
WC-21	Gorst		Yes	Yes			Yes	Yes	■	■	■	■	■	■	■	■	■	■	■	■
WC-22	East Port Orchard			Yes				Yes	■	■	■	■	■			■	■	■	■	■
WC-23	Orchard Point			Yes				Yes	■	■	■	■	■			■	■	■	■	■
WC-24	Restoration Point					Yes		Yes		■	■	■	■	■	■					
WC-28	Sinclair Inlet					Yes		Yes		■	■	■	■	■	■					
WC-29	Blake Island					Yes		Yes		■	■	■	■	■	■					
WC-30	View Park					Yes		Yes		■	■	■	■	■	■					

FLIGHT RESTRICTION ZONES / SENSITIVE WILDLIFE SUMMARY (continued)

Code	Location	Seabird Colony	Seabird Conc.	Waterfowl Conc.	Marine Mammal Haulout	Sensitive Nesting Species	Shorebird Conc.	Flight Exclusion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
WC-31	Sylvan Beach					Yes		Yes												
WC-32	Seahurst					Yes		Yes												
WC-33	Command Point					Yes		Yes												
WC-34	Point Beals					Yes		Yes												
WC-35	Colvos Passage		Yes					No												
WC-36	Quartermaster Harbor					Yes		Yes												
WC-37	Point Dalco					Yes		Yes												
WC-38	Neill Point					Yes		Yes												
WC-40	Redondo					Yes		Yes												
WC-41	Point Defiance					Yes		Yes												
WC-42	Dumas Bay					Yes		Yes												
WC-44	Commencement Bay																			
WC-45	Illahee					Yes		Yes												
WC-46	South tip of Bainbridge Island			Yes																
WC-47	Alki Point south to Point Williams			Yes																
WC-48	Quartermaster Harbor		Yes	Yes																

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7. Logistical Information

The following is not a complete list of logistical resources - for more information please refer to the Northwest Area Contingency Plan (NWACP), Chapter 5000, Logistics.

To submit data for this section, please use Comments/ Corrections/ Suggestions (Appendix C).

7.1. Central Puget Sound Logistical Support

Subject	Name	Characteristics	Contact	Phone #
Command Posts				
See Page 5-22 NWACP				
Communications				
See Pages 5-11 to 5-21				
Summary of Area Resource Equipment				
See Pages 5-102 to 5-132				
Helicopter Support/ Air Support	Auburn Municipal Airport	King County	400 23rd Avenue / Auburn, WA 98002	(253) 931-3026
	Boeing Field / King County International Airport	King County	PO Box 80245 / Seattle, WA 98108	(206) 296-7392 or (206) 296-7380
	Renton Municipal Airport	King County	616 Perimeter Road / Renton, WA 98055	(425) 430-7471
	Tacoma Narrows Airport	Pierce County	1022 26th Avenue NW / Gig Harbor, WA 98335	(253) 853-5844
	Bremerton National Airport	Kitsap County	8850 SW , State Highway 3 / Port Orchard, WA	(360) 674-2381
	Sea-Tac International Airport	King County	Sea-Tac	(206) 433-4645
	Crest Airport	King County	29300 179th Place S / Kent, WA 98042	(253) 631-7100
Tribal Resources	Muckleshoot Indian Tribal Council	King County	39015 172nd SE / Auburn, WA 98002	(253) 939-3311
	Puyallup Tribal Council	Pierce County	2002 E. 28th Street / Tacoma, WA 98404	(253) 597-6200
	Suquamish Tribal Council	Kitsap County	PO Box 498 / Suquamish, WA 98392	(360) 426-4441
	Point No Point Treaty Council	Kitsap County	7999 NE Salish Lane / Kingston, WA 98346	
	Port Gamble Community Council	Kitsap County	PO Box 280 / Kingston, WA 98346	(360) 297-2646

Subject	Name	Characteristics	Contact	Phone #
Fire Department				
	Bellevue Fire Dept.	King County	766 Bellevue Way SE / Bellevue, WA 98004	(425) 452-6892
	Bremerton Fire Dept.	Kitsap County	817 Pacific Ave. / Bremerton, WA 98310	(360) 478-5380
	Chief Tacoma Fire Dept. Hdqtrs.	Pierce County	901 Fawcett / Tacoma, WA 98402	(253)591-5737
	Dupont Fire Dept.	Pierce County	302 Louviers Ave. / Dupont, WA 98327	(253) 964-8414
	Edmonds Fire Dept.	Snohomish County	250 5th Ave. N / Edmonds, WA 98020	(425) 771-0215
	Seattle Fire Dept.	King County	301-2nd Avenue South / Seattle, WA 98104	(206) 386-1400
	King County Fire Dist. # 11	King County	1234 SW 112th / White Center	(206) 243-0330
	King County Fire Dist. #13	King County	10019 SW Bank Rd. / Vashon Island	(206)463-2405
	King County Fire Dist. #16	King County	18030 73rd Ave. NE / Bothell	(425) 486-2784
	King County Fire Dist. #2	King County	151100-8th Ave. SW / Burien	(206) 242-2040
	King County Fire Dist. #20	King County	12617-76th Ave. S / Skyway	(206)772-1430
	King County Fire Dist. #26	King County	2238 S 223rd / Des Moines	(206)878-2210
	King County Fire Federal Way	King County	31617-1st Ave. S / Federal Way	(253)839-6234
	King County Fire Dist. #4	King County	1016 N 175th / Shoreline	(206) 546-5716
	Kirkland Fire Dept.	King County	123-5th Ave. / Kirkland	(425) 828-1143
	Kitsap County Fire & Rescue, Dist. #1	Kitsap County	10955 Silverdale Way NW / Silverdale	(360) 692-2551
	North Kitsap Fire & Rescue	Kitsap County	11171 NE Highway 104 / Kingston	(360) 297-3619
	Kitsap County Fire Dist. #12	Kitsap County	4071 Chico Way NW / Bremerton	(360) 377-4744
	Kitsap County Fire Dist. #14	Kitsap County	7549 NE Twin Spits Road / Hansville	(360) 638-2263
	Central Kitsap Fire & Rescue	Kitsap County	7600 Military Road NE / Bremerton	(360) 692-0880
	Kitsap County Fire Dist. #18	Kitsap County	911 Liberty Lane / Poulsbo	(360) 779-3997
	Kitsap County Fire Dist. #2	Kitsap County	8895 Madison Ave N / Bainbridge Island	(206) 842-7686
	North Kitsap Fire & Rescue	Kitsap County	P.O. Box 41 / Kingston	(360) 297-3619
	Kitsap County Fire Dist. #7	Kitsap County	1974 Fircrest Dr. SE / Port Orchard	(360) 871-2411
	Lynnwood Fire Dept.	Snohomish County	19100 44th Ave. W / Lynnwood	(425) 775-3471
	Tacoma Fire Dept.	Pierce County	2015 54th Ave. E / Tacoma	(253) 922-8424

Subject	Name	Characteristics	Contact	Phone #
Local Support Personnel	Bremerton City Hall (Mayor's Office)	Kitsap County	239 Fourth St / Bremerton	(360) 478-5266
	City of Sea-Tac City Hall	King County	19215-28th Ave. S / Sea-Tac	(206) 241-9100
	Kirkland DEM	King County	123 Fifth Ave.	(425) 828-1283
	Seattle Office of Emergency Services	King County	301 Second Avenue S / Seattle	(206) 296-3830
	Tacoma Director of Emergency Management	Pierce County	420 Fawcett St / Tacoma	(253) 798-7470
	Seattle Police Dept.	King County	610 Third Avenue / Seattle	(206) 583-2111
	Tacoma Police Dept.	Pierce County	930 Tacoma Ave. S / Tacoma	(253) 593-4721
	King County DEM	King County	516 Third Ave. / Seattle	(206) 296-3830
	Kitsap County DEM	Kitsap County	1720 Warren / Bremerton	(360) 337-7119
	Pierce County DEM	Pierce County	930 Tacoma Ave. S / Tacoma	(253) 798-7470
	Pierce County Sheriff	Pierce County	Tacoma	(253) 798-4722
	Snohomish County Sheriff	Snohomish County	3000 Rockefeller / Everett	(425) 388-3414
	Kitsap County Sheriff	Kitsap County	614 Division St. / Port Orchard	(360) 337-7145
Marinas/Port Docks	Point Defiance Ramp	Pierce County	Point Defiance Park / next to Vashon ferry landing / Tacoma	
	Totem Marina	Pierce County	821 Dock St. / Tacoma	
	Olie & Charlie's Marina	Pierce County	Marine View Drive / Tacoma	
	Des Moines Marina	King County	Downtown Des Moines	
	East Gig Harbor access	Pierce County	South end of Randall Dr NW / Gig Harbor	
	Ollala Ramp	Kitsap County	Off Ollala Way/ Port Orchard	
	Armeni Ramp	King County	Next to Seacrest Boat House, off Harbor Ave./ Seattle	
	Sunnyside Ramp	King County	Sunnyside Ave. and N. Northlake Way/ Seattle	
	Meadowdale Marina	Snohomish County	162nd Ave. SW/ Meadowdale	
	Shilshole Ramp	King County	Seaview Ave. /Seattle	
	14th Street Ramp	King County	End of 14th St./ Ballard	
	Port of Edmonds Marina	Snohomish County	South end of Admiral Way/ Edmonds	
	Evergreen Park Boat Ramp	Kitsap County	Evergreen Park/ Bremerton	
	Lion's Field Park & Ramp	Kitsap County	Off Sheridan Road/ Bremerton	
	Illahee State Park Ramp	Kitsap County	Illahee State Park	
	Tracyton Ramp	Kitsap County	Town of Tracyton	
	Brownsville Marina	Kitsap County	Town of Brownsville	
	Silverdale Ramp	Kitsap County	Town of Silverdale	
	Poulsbo Ramp	Kitsap County	Town of Poulsbo	

Subject	Name	Characteristics	Contact	Phone #
Marinas/Port Docks (continued)	Port Orchard Public Ramp	Kitsap County	Town of Port Orchard	
	Eagle Harbor Waterfront Park	Kitsap County	Eagle Harbor/ Bainbridge Island	
	Miller Bay Ramp	Kitsap County	On Miller Bay, near Suquamish	
	Annapolis Public Ramp	Kitsap County	Near Port Orchard	
Housing/Feeding/Response Community Support	Airlift Northwest	King County	6987 Perimeter Road/ Seattle	1-800-426-2430
	Auburn General Hospital	Pierce County	20 Second St NE/ Auburn	(253) 833-7711
	Ballard Community Hospital	King County	NW Market and Barnes/ Seattle	(206)782-2700
	Bremerton Naval Hospital	Kitsap County	Bremerton	(360) 475-4000
	Children's Hospital and Medical Center	King County	4800 Sand Point Way NE/ Seattle	(206) 526-2000
	Evergreen Hospital	King County	12040 NE 128th Street/ Kirkland	(425) 899-1000
	Fifth Avenue Hospital	King County	10560 Fifth Avenue NE/ Seattle	(206) 364-2050
	Group Health Central Hospital	King County	201 16th Avenue E/ Seattle	(206) 326-3000
	Group Health Eastside Hospital	King County	2700 152nd NE/ Redmond	(425) 883-5151
	Harborview Medical Center	King County	325 Ninth Avenue/ Seattle	(206) 731-3000
Fishing Fleets & Affiliated Organizations	Puget Sound Gillnetters Assoc.	King County	Fisherman's Terminal/ Seattle	
Boat Cleaning Capability	Airo Services	Pierce County	4110 East 11th St./ Tacoma	(253)383-4916 24 hr. number
	Foss Environmental	King County	660 West Ewing St./ Seattle	1-800-337-7455 24 hr. number

Appendices

Appendix A: Summary of Protection Techniques

Protection Techniques	Description	Primary Logistical Requirements	Limitations
ONSHORE			
Beach Berms	A berm is constructed along the top of the mid-inter tidal zone from sediments ex-cavated along the downgradient side. The berm should be covered with plastic or geo-textile sheeting to minimize wave erosion.	• Bulldozer/Motor grader -1 • Personnel - equipment operator & 1 worker • Misc. - plastic or geotextile sheeting	• High wave energy • Large tidal range • Strong along shore currents
Geotextiles	A roll of geotextile, plastic sheeting, or other impermeable material is spread along the bottom of the supra-tidal zone & fastened to the underlying logs or stakes placed in the ground.	• Geotextile - 3 m wide rolls • Personnel - 5 • Misc. - stakes or tie-down cord	• Low sloped shoreline • High spring tides • Large storms
Sorbent Barriers	A barrier is constructed by installing two parallel lines of stakes across a channel, fastening wire mesh to the stakes & filling the space between with loose sorbents.	Per 30 meters of barrier • Wire mesh - 70 m x 2 m • Stakes - 20 • Sorbents - 30 m^2 • Personnel - 2 • Misc. - fasteners, support lines, additional stakes, etc.	• Waves > 25 cm • Currents > 0.5 m/s • Tidal range > 2 m
Inlet Dams	A dam is constructed across the channel using local soil or beach sediments to exclude oil from entering channel.	• Loader - 1 • Personnel - equipment operator & 1 worker or several workers w/shovels	• Waves > 25 cm • Tidal range exceeding dam height • Freshwater outflow

NEARSHORE			
Containment Booming	Boom is deployed in a "U" shape in front of the oncoming slick. The ends of the booms are anchored by work boats or drogues. The oil is contained within the "U" & prevented from reaching the shore.	For 150 meters Slick: • Boom - 280 m • Boats - 2 • Personnel - boat crews & 4 boom tenders • Misc. - tow lines, drogues, connectors, etc.	• High winds • Swells > 2 m • Breaking waves > 50 cm • Currents > 1.0 m/s
Exclusion Booming	Boom is deployed across or around sensitive areas & anchored in place. Approaching oil is deflected or contained by boom.	Per 300 meters of Boom • Boats - 1 • Personnel - boat crew & 3 boom tenders • Misc.- 6 anchors, anchor line, buoys, etc.	• Currents > 0.5 m/s • Breaking waves > 50 cm • Water depth > 20 m
Deflection Booming	Boom is deployed from the shoreline away from the approaching slick & anchored or held in place with a work boat. Oil is deflected away from shoreline.	Single Boom, 0.75 m/s knot current • Boom - 60 m • Boats - 1 • Personnel - boat crew + 3 • Misc. - 3 anchors, line, buoys, recovery unit	• Currents > 1.0 m/s • Breaking waves > 50 cm
Diversion Booming	Boom is deployed from the shoreline at an angle towards the approaching slick & anchored or held in place with a work boat. Oil is diverted towards the shoreline for recovery.	Single Boom, 0.75 m/s knot current • Boom - 60 m • boats - 1 • Personnel - boat crew + 3 • Misc. - 3 anchors, line, buoys, recovery unit	• Currents > 1.0 m/s • Breaking waves > 50 cm
Skimming	Self-propelled skimmers work back & forth along the leading edge of a windrow to recover the oil. Booms may be deployed from the front of a skimmer in a "V" configuration to increase sweep width. Portable skimmers are placed within containment booms in the area of heaviest oil concentration.	Self-propelled (None) Towed • Boom - 200 m • Boats - 2 • Personnel - boat crews & 4 boom tenders • Misc. - tow lines, bridles, connectors, etc. Portable • Hoses - 30 m discharge • Oil storage - 2000 liters	• High winds • Swells > 2 m • Breaking waves > 50 cm • Currents > 1.0 m/s

Source is R. Miller of Clean Sound Cooperative.

Appendix B: Original Geographic Response Plan Contributors

Local Representatives
Byron Haley, Metro Park District Tacoma
Ed Bruett, Kitsap Co. DEM
Richard Lawson, Tacoma Fire Dept.
John Komorita, King County
Bill Lokey, Pierce County DEM
Shad Burcham, King County DEM

Industry and Response Contractors
Ruel Harder, Seattle Steam Co.
Bob Wiechert, Clean Sound Cooperative
Mike Kelley, Clean Sound Cooperative
Mac McCarthy, Clean Sound Cooperative
John Waters, Clean Sound Cooperative
Bob Bunton, ARCO
Svenk Eklof, PWES
John Murphy, GENWEST SYS.
John Crawford, FOSS
Steve Collar, Crowley Marine
Greg Narum, Simpson Tacoma Kraft Co.
Bill Park, MSRC
Mike LaTorre, MSRC
Dru Wojtanik, Ecology and Environment
Tim Clark, Clean Sound Cooperative
Thom Davis, Global Environmental
Ron Larsen, Global Environmental
Gary Putnam, Shell Oil
Aaron Anderson, Olympus Enviro.
Edward Traina, Shell Oil Co.
Donald Johnson, Shell Oil Co.
Karen Grein-Nagle, Olympic Pipeline
Mike Mattingly, AIRO Services
Ray Burke, Sound Refining
Mike Brady, Riedel Environmental Services
Trygve Enger, Foss Environmental
Trip Ellison, Riedel Environmental Services
Jim Riedel, Riedel Environmental Services
Dick Shabro, Olympus Enviro
Harold Haskins, U.S. Oil
Harry Hutchins, Marine Exchange
Mike Vomund, Chevron
Global Diving and Salvage

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Sara LaBorde

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Washington State Maritime Commission
Bob Dorn

Washington Department of Natural Resources
Dave Jamison

Parks and Recreation Commission
Mike Ramsey

Other
Susan Berta, WSU Island Co. Beach Watchers
Richard Shafer
Shirley Flies, Puget Sound Alliance
Ken Moser, Puget Soundkeeper

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Appendix C: Geographic Response Plan Comments/Corrections/Suggestions

If you have any questions regarding this document or find any errors, please notify one of the following agencies: or use tear out sheet (page C-3)

- USCG Marine Safety Office Puget Sound, Planning Department
- USCG Marine Safety Office Portland
- Washington Department of Ecology, SPPR program, Preparedness Unit
- Oregon Department of Environmental Quality
- Idaho Emergency Response Commission
- Environmental Protection Agency Region 10

Phone Numbers:

USCG MSO Puget Sound	(206) 217-6213
USCG MSO Portland	(503) 240-9307
Washington DOE	(206) 407-6971
Oregon DEQ	(503) 229-5774
Idaho ERC	(208) 334-3263
EPA	(206) 553-6901

Bulletin Board System (BBS):

USCG MSO Puget Sound	(206) 217-6216
USCG MSO Portland	(503) 240-9308

Internet/E-mail Address:

WADOE	dald461@ecy.wa.gov
OR DEQ	wylie.jack@deq.state.or.us
USCG MSO Puget Sound	ATucci@pacnorwest.uscg.mil
USCG MSO Portland	cfriese@pacnorwest.uscg.mil
USEPA	sheldrake.beth@epamail.epa.gov

Address:

Commanding Officer
United States Coast Guard
MSO Puget Sound
Planning Department
1519 Alaskan Way South
Seattle, WA 98134-1192

Commanding Officer
United States Coast Guard
Planning Department
MSO Portland
6767 North Basin Ave
Portland, OR 97217-3992

Washington Department Of Ecology
SPPR Program
Preparedness Unit
P.O. Box 47600
Olympia, WA 98504-7600

Oregon Department of Environmental Quality
Water Quality Division
811 SW Sixth Avenue
Portland, OR 97204

Office Of The Governor
Idaho Emergency Response Commission
1109 Main
Statehouse
Boise, ID 83720-7000

Environmental Protection Agency
Emergency Response Branch
1200 Sixth Avenue
Seattle, WA 98101

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Geographic Response Plan

Comments/Corrections/Suggestions

Directions:

Fill in your name, address, agency, and phone number. Fill in the blanks regarding the location of information in the plan being commented on. Make comments in the space provided. Add extra sheets as necessary. Fold in thirds so the address label is visible and tape closed (don't staple).

Name: _____ Title:_____ Agency: _____

Address:_____

City: _____ State/Province:_____ Zip/Postal Code: _____

Phone: (____) _____

Page Number: _____

Location on page (chapter, section, paragraph) (e.g. 2.1, paragraph 3): _____

Comments: _____

_____

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_____

Northwest Area Committees
c/o Washington Department of Ecology
Spill Preparedness Unit - GRP Corrections
P.O. Box 47600
Olympia, WA 98504-7600